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BY LIONEL WHITBY, C.V.O., M.C., M.D. Camb., F.R.C.P.
ASSISTANT PATHOLOGIST TO THE MIDDLESEX HOSPITAL, LONDON

THE credit for making the most remarkable recent advance in modern therapeutics—namely, the discovery of the antistreptococcal activity of an azo-dye containing a sulphonamide group—belongs entirely to Domagk and his assistants, Mietzch and Klarer, of the I.G. Farbenindustrie at Elberfeld. It is fitting that the ambitions and triumphs of Ehrlich should receive this impetus in the country of his birth. It is characteristic of German thoroughness that although Prontosil was patented in 1932 it was not until February, 1935, that Domagk [53] published his experimental results concerning the effect of prontosil in animals. There followed a series of clinical reports [96] in the German literature concerning work which had been going on during the trial period.

The original prontosil, now rarely used, consisted of a water-insoluble basic azo-dye (sulphamido-chrysoidin) suitable for oral administration; for the purposes of parenteral therapy an acid dye known as prontosil soluble had to be evolved. Some twenty years before Domagk made his remarkable discovery compounds of prontosil type had been prepared and studied, not for the purposes of medicine but for the dyeing of textiles [96]; they were notable for their fastness in washing and milling. And a few years later it was found that azo compounds had an in-vitro bactericidal action,[59] as had also dihydro-cuprein when linked up, among other things, with sulphonamide.[93] Heidelberger and Jacobs [93] in 1919 were within an ace of making Domagk's discovery.

Problems which at the outset appear complex are often found to be relatively simple. It was early suggested and later proved that the complex molecule of sulphamido-chrysoidin owed much of its virtue to the fact that it could be reduced to *p*-amino-benzenesulphonamide in the body.[40 74 166] This simpler compound was equally effective in experimental infections, and its action on streptococci and other bacteria was demonstrable in vitro. This discovery had the advantage of freeing investigation from the shackles associated with patent rights and of opening up the path for independent research.

P-aminobenzenesulphonamide, now known as sulphanilamide, has been studied intensively from all aspects. It has formed the standard with which all new derivatives have been compared. It is marketed under several trade names. As Garrod [75] has so aptly remarked: "Some of the trade names afford a clue to identity, whilst others appear quite meaningless. It is to be hoped that manufacturers gain some advantage from this practice commensurate with the confusion which it causes."

Amino Compounds

Much work has been devoted to improving the parent substance, sulphanilamide, with the object of increasing efficiency, widening the range of bacterial diseases which can be influenced, and reducing its toxic but rarely fatal effects. Only a few of many allied compounds have merited and have been submitted to clinical trial. Well over a thousand such compounds have been studied in the Elberfeld [96] laboratories alone, and many have been tried in France,[71 79] this country,[29 32 62 80 173 176] and in America.[151 152] I can only speak of those compounds of which I have had experience, or which have come into practical use.

Sulphanilamide consists of a benzenesulphonamide with an amino group in the para position; activity is removed if the amino group is transferred to the ortho or meta positions. Other compounds which have excited interest or have been found worthy of clinical trial fall approximately into three groups:—

(1) Those in which substitution has been made in the amino group: sulphamido-chrysoidin; prontosil soluble, benzyl-aminobenzenesulphonamide (Proseptasine), and Soluseptasine.

(2) Those in which one hydrogen atom of the sulphonamido group has been substituted: Uleron; 2-(*p*-aminobenzenesulphonamido) pyridine [176] (M. & B. 693); 4–4′ diaminobenzenesulphonanilide [173]; 4-amino 4′-dimethylaminobenzenesulphonanilide [173]; and 4–3′ diaminobenzenesulphonanilide.[62]

(3) Compounds of sulphone type which are chemically unrelated to the sulphonamides: 4–4′ acetamidodiphenylsulphone [73]; 4–4′ diamino diphenylsulphone.[32 73]

The last group shows that the sulphonamide group is not the only chemical structure which is effective in bacterial infections. This supports Domagk's contention that the activity of prontosil is not entirely due to its reduction to sulphanilamide in the body. Indeed, 100 c.cm. of 2·5 per cent. prontosil yields only 0·7 g. of sulphanilamide; hence, weight for weight, prontosil is more active than sulphanilamide. Expert chemists have carefully studied the structure of active compounds but have been unable to deduce what makes one compound more active than another closely related one, or what gives a compound activity over a wider range. There is no easy theoretical solution to this problem; so research at the present day is largely a matter of tedious empirical trial and error.

A survey of the three groups of compounds establishes certain facts. In the first group, in which may be included sulphanilamide itself, the range of activity is approximately the same; there is activity against hæmolytic streptococci [18 93] of Groups A, B, C, but not D and F, meningococci,[146] and gonococci,[113] but none against the pneumococcus with the exception of Type III, which is itself virtually a streptococcus. Toxicity and solubility are altered rather than efficiency or range. Multiplication of sulphonamide groups tends to extinguish activity.[39]

In the second group the range of activity in most has been increased to include at least pneumococcus, and they possess also an equal if not greater activity against bacteria affected by the first group; 2-(*p*-aminobenzenesulphonamide) pyridine (M. & B. 693) is outstandingly the best member of this group. If the amino group is also substituted, this pyridine compound loses much of its activity.

With regard to the sulphones, the range of activity is again extended to include pneumococcus, and efficiency against *Streptococcus hæmolyticus* is increased but toxicity has rendered them unsuitable for clinical trial.

TESTS OF THERAPEUTIC POTENCY

Assessment of activity has been carried out by two methods: (1) by a properly controlled series of

* The Bradshaw lecture for 1938 delivered before the Royal College of Physicians of London on Nov. 3rd.

animal experiments, and (2) by clinical trial in human disease. Difficulties arise in both these methods of assessment.[174 175] Assessment has been accomplished with mice in the case of hæmolytic streptococci [40 53 173] and pneumococci [176] and with more difficulty in the case of meningococci [29.111 146 173] and gonococci.[113] New synthetic compounds designed to improve the existing remedies for these four infections can quickly be assessed. In the case of *Bact. coli* [104] assessment can be made by simple in-vitro experiments, but with many infecting organisms, such as staphylococcus,[133] *Bact. typhosum*,[31] salmonella organisms,[31] Sonne dysentery,[27] *Cl. welchii*,[17 119] and *Brucella abortus*,[36] only a broad hint as to efficiency can be obtained, and no laboratory animal is susceptible to *Streptococcus viridans*. Here assessment has to wait for the much slower and often inadequately controlled procedure of the clinical field.

On the clinical side excellent assessments have been made in puerperal sepsis [41 42 43 70 77] due to hæmolytic streptococci, in erysipelas,[15 22 159] in streptococcal meningitis and otitis,[7 34 46 85 139 157 171] in meningococcal infections,[9 60 103 155 182] in gonorrhœa,[38 39 45 48 170] in soft sore,[13 88 100] in pneumonia,[61] and in coliform infections of the urinary tract.[26 35 104] It will require the highest clinical judgment and large experience to assess properly the effect in spontaneously curable diseases such as brucella infections,[4] rheumatic disease, and tuberculosis. From the wealth of published work, experimental and clinical, it is possible to form some judgment of the advantages and disadvantages of the various compounds now in general use and to comment on the best method of administration.

The ideal drug is one in which efficiency is maximal and toxicity minimal. An even greater ideal would be a non-toxic substance which would form a depôt sufficient for slow and steady absorption to maintain an adequate blood level for a reasonable time, thus avoiding the necessity for multiple doses. With the drugs at present available the minor symptoms of toxicity are now known to be far less serious than was at first supposed, and such symptoms should not prohibit continuance of treatment in those whose severe illness can be controlled only by an efficient concentration of the drug.

The acute phases of serious generalised infections are the most amenable to treatment, and early treatment in these is desirable; but there is a suggestion from clinical trials [39] that in localised infections, especially gonorrhœa, there is some advantage in delaying treatment until there is an immunological response on the part of the body. Dosage, the duration of the course, and the employment of adjuvants provide ample opportunity for the art of medicine where experience and judgment will give the best results. Experimentally and clinically it is clear that what these drugs are going to accomplish, that they do quickly. There is, therefore, no justification for giving a prolonged course, especially since such a procedure is the one which causes the rare and serious toxic complications. These are basic principles for the use of all these drugs.

Sulphanilamide

Sulphanilamide is the most widely used of all these drugs. Its absorption, excretion, pharmacology, toxicity, and mode of action have been extensively studied. An ordinary dose is absorbed in about four hours from the alimentary canal, and an effective level in the blood and spinal fluid [126 127] is quickly attained, besides its penetrating into all organs, secretions, and effusions, as well as into fœtal tissues when administered to a pregnant animal.[106] Nevertheless the amount absorbed varies considerably in different individuals and in different animals. The drug is also soluble to the extent of 0·8 per cent. at body temperature; hence a solution in water or saline is available for subcutaneous, intramuscular, or intrathecal injection.

Sulphanilamide is completely excreted in the urine in twenty-four hours in both a free and a conjugated acetylated inert form; excretion is delayed by renal damage. Excretion increases with increased urinary outflow, and the drug may, therefore, be washed out of the body, when toxic symptoms are severe, by inducing simple diuresis with water. The drug may be tested for by a colorimetric test.[126 127]

The effect of one dose persists for about six hours, and for continuous treatment doses should be administered at intervals of four to six hours. It is at present agreed that, in severe infections, a large initial dose is desirable in order to obtain an adequate blood level as soon as possible. The ideal procedure is to estimate the blood content four hours after the first dose and, if this is below 10 mg. per 100 c.cm., to supplement oral administration by subcutaneous injections of sulphanilamide itself or one of the soluble preparations.

Those [117 118] who have carefully studied blood concentration in relation to dose recommend for those seriously ill a total daily dosage of 1 g. per 20 lb. of body-weight (maximum 5 g.), suitably spaced, for the first two or three days, which is graded down during the next week. Children [119] require at least a 50 per cent. larger dose in proportion to body-weight than do adults, and in certain infections even more. Probably this general scheme of dosage will eventually be modified, for experimental work [142] suggests that small doses at shorter intervals may be more effective. A second course may be given after an interval of a few days, if it is necessary or thought desirable; for this second course a change of drug is probably an advantage.

TOXIC EFFECTS

Lower animals tolerate the drug well. The curative dose for mice would be the equivalent of 150 g. daily for man; yet in man a dose of as little as 3 g. daily may produce definite toxic effects. There has been no report in man of the central nervous system degenerative changes which massive doses produce in rabbits.[92] Minor symptoms, such as nausea, dizziness, disorientation, and depression, are common, especially in ambulant patients. Although these are not serious from the medical aspect, they are a definite danger to the community from the point of view of such things as street accidents. The purchase of this drug, well known to the laity for its use in gonorrhœa, will fortunately soon not be open to the public.

Treatment necessarily produces some degree of acidosis,[3 119 128 160] which may be overcome by giving alkalis. Sulphæmoglobinæmia and methæmoglobinæmia, often insufficient to cause definite cyanosis,[51] commonly occur. Measures for preventing this complication,[8 144] which are directed towards reducing the absorption of H_2S from the bowel, are well known. No fatalities from cyanosis have been recorded; it can often be disregarded and may disappear despite the continuation of treatment.

Fever, which may be severe, occurs usually 7–10 days after the beginning of treatment and may be mistaken for a recrudescence of the original infection. Such fever appears not to be due to hypersensitivity

to the drug.[84] In many respects the fever resembles serum sickness, and the most likely explanation is a reaction to the products of lysed bacteria. The accompanying rash [154] is found mostly on the exposed portions of the skin and may be the result of photosensitisation due to the porphyrinuria [149 177] which the drug itself is known to cause. Agranulocytosis, anæmia, and exfoliative dermatitis [139] are the most serious complications; agranulocytosis has been responsible for 6 fatalities in 8 cases so far reported.[24] In all a prolonged course of the drug has been given. Fig. 1 shows the course of recovery of a hæmoglobin and leucocyte count in a patient who had been given a continuous daily course of 3 g. for four months. The problem of agranulocytosis has been studied in ambulant patients, and a significant neutropenia has been found in as many as half.[16 24] Dangerous agranulocytosis is undoubtedly due to idiosyncrasy, in the same way as with amidopyrine; particular care is necessary in debilitated patients, but blood examinations do not always forecast a sudden disaster.[180]

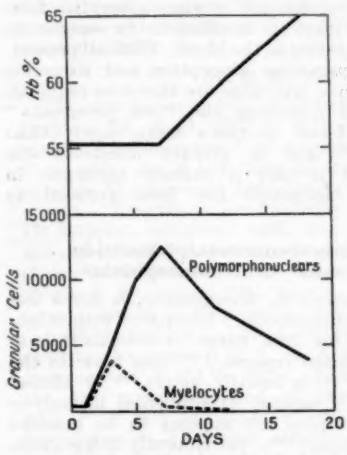

FIG. 1.—Graphs illustrating course of recovery in hæmoglobin and granular leucocytes after stopping sulphanilamide. Note rapid leucocytosis and transient appearance of myelocytes.

Acute hæmolytic anæmia [91 105] is rare but occurs early; it is amenable to treatment with transfusion, and the subjects of acute hæmolytic anæmia, per se, are not necessarily made worse with sulphanilamide.[61] Other types of anæmia are also recorded.[102 162]

APPLICATION TO VARIOUS INFECTIONS

The rational use of sulphanilamide definitely demands a bacteriological as well as a clinical diagnosis. It is not a specific for a pathological process but for specific organisms which produce such processes. Neither can it do away with the necessity for drainage when a collection of pus is present. In *acute streptococcal infections*, septicæmia, and erysipelas, the general scheme based on body-weight may well be followed. Much higher doses (12 g. daily) have been used,[59] but there is no good reason for using excessive doses or for supplementing treatment with the injection of soluble preparations when facilities are available for estimating whether the blood contains an adequate amount of sulphanilamide.

In *meningococcal meningitis* the drug has been found effective in both Group 1 and Group 2 infections.[9] Chemical studies [1 44 126 127] show that either oral administration or subcutaneous injection causes it rapidly to reach the spinal fluid of normal subjects and those with inflamed meninges. There is much individual variation, and it is recommended [9] that the concentration of sulphanilamide in the spinal fluid should reach 5 mg. per 100 c.cm. in the first twenty-four hours and be maintained at this level for three days. Early treatment is imperative; and, since the two red dyes, sulphamido-chrysoidin and prontosil soluble, penetrate far less rapidly [101] than sulphanilamide, the latter is the compound of choice for meningococcal meningitis.

Optimum treatment is not yet agreed upon; some have administered sulphanilamide orally and subcutaneously,[139] some have combined one of these routes with intrathecal injection,[44 60 155] some have combined the drug with meningococcal serum, [9 103 136] and some have used oral administration of sulphanilamide alone.[9 137] Most, when advocating a particular route or a particular technique, have either failed or have been unable to provide adequate controls. The excellent report of Banks [9] is the only critical clinical report on the subject.

As to the route of administration, since either oral or subcutaneous administrations produce an effective concentration in the spinal fluid, and since lumbar puncture for the first few days must always be a part of proper treatment, there is always a specimen of fluid available with which to check concentration. One cannot but be impressed by the good result obtained by oral administration by Banks [9] and others,[178] as well as in a large series from French Nigeria,[127] and there is much to be said for the avoidance of multiple lumbar punctures if the late complications of fibrosis and hydrocephaly are to be avoided. I see no reason, therefore, to advocate the intrathecal route, save perhaps for a preliminary injection and when an adequate level of the drug cannot be attained by any other means.

Whether serum should be used to supplement sulphanilamide cannot confidently be stated. There are the questions of route and dose as well as the difficult choice of which type of serum, antitoxic or antibacterial, is to be used. Experimentally,[21 25] serum and sulphanilamide have been found to be more effective than either alone, and clinical evidence is in favour of combining intravenous or intraperitoneal serum therapy with the drug in severe cases; but with mild cases in the favourable age-period, 5–20 years, there is much evidence from Banks's series that the drug alone is sufficient with the dosage used by him. Chronic long-standing cases respond badly. Meningococcal septicæmia [155 182] is equally amenable to treatment.

Gonorrhœa has been the subject of a number of statistically significant clinical reports. In this country sulphanilamide is preferred by most to the preparation uleron, which the Germans regard as superior. Almost all reports record some 10–20 per cent. of patients who fail to respond, and it is also clear that, depending on the method of exhibition of the drug, a considerable number of patients may be placed in the dangerous state of being symptom-free with an infection which is latent and residual.[2] The technique of treatment and the results to be expected in different forms of disease are in the process of being defined; haphazard treatment is greatly to be deprecated, and it is imperative for the laity to realise that sulphanilamide has no value as a prophylactic. Indeed the most experienced and critical observers definitely state that treatment is more effective when begun after the acute stage is passed.[38 89] Those responsible for the treatment of this disease should refer to the report of Cokkinis and McElligott,[39] who advocate active immunisation with vaccine for 8–10 days before beginning treatment with the drug.

Sulphanilamide greatly reduces the number of complications and is also effective in metastatic gonorrhœa as well as in ophthalmia [179] and epidemic vulvo-vaginitis.[97] There is the disadvantage that the drug is administered to ambulant patients.

As to *non-venereal genito-urinary infections*, particularly infections with *Bact. coli*,[131 167 172] early trial with sulphamido-chrysoidin and with prontosil soluble gave hopeful results, and sulphanilamide is now known to be the better and more effective for treating such infections.[26 38 47 56 104] Treatment renders the urine itself bactericidal to a number of organisms.[121] An alkaline urine, which is always produced during treatment, is more bactericidal than an acid urine.[90] Sulphanilamide, with mandelic acid as a supplement or a complement, has greatly increased the effectiveness of treatment for these common and stubborn urinary infections. Whereas sulphanilamide is effective against *Bact. coli* as well as *Proteus vulgaris*,[94] it is ineffective against *Streptococcus fæcalis* and against Group D β-hæmolytic streptococci. Mandelic acid, ineffective against *Proteus vulgaris*, will eliminate most streptococcal infections; it demands an acid urine and a good renal function, whereas impairment of this function does not prohibit sulphanilamide treatment. Sulphanilamide penetrates more effectively than mandelic acid into the prostatic secretion [56] and is useful when prostatitis coexists. Activity against *Bact. coli* has also been found in a disease of serious prognosis, suppurative pylephlebitis.[143]

Sulphanilamide has been used by an experimentally minded profession for many diseases concerning which little or no controlled experimental work is available or possible.

There has been no organised clinical assessment of *staphylococcal* infections yet, but experimental evidence [27 133] points definitely to some activity of the drug against this organism (Tables II and III), and such few clinical reports as are available [11 43] are sufficiently encouraging to warrant a proper trial in both local and generalised infections. Neither have the *typhoid and paratyphoid fevers* received the clinical trial which experimental work [31] merits; there are some few cases reported of the successful treatment of urinary carriers.[12 14] *Gas-gangrene*, for which again there is good experimental evidence,[17 119 161] has received only a few clinical reports,[20] but these justify the use of the drug in the disease. Successes have been claimed for *actinomycosis*,[169] for *undulant fever* [4] of both melitensis [140] and abortus [35 124 163] types, and for Friedländer infections; the last named is supported by experimental evidence.[81] Unconfirmed experimental work and insufficient or unconvincing clinical reports forbid the passing of judgment on successes claimed in the treatment of experimental *tuberculosis*,[30 148] *lymphogranuloma inguinale*,[78 108 122] *malaria*,[5] and *bubonic plague*.[33] There is no good evidence that sulphanilamide has any beneficial action on *rheumatic fever* [75 139] or any of the respiratory or neurotropic groups of viruses.[133 141] Admittedly it may profoundly influence the secondary infections which so commonly follow infection with a respiratory virus. Success has been claimed for the cure of canine *distemper*,[52 125] a virus disease, but here again sulphanilamide may readily reduce or modify the secondary infection which causes most of the mortality of this disease, and not all trials have been successful.[49] Experimental work with *H. pertussis* [46 83] suggests that sulphanilamide will not affect the primary infection; yet there are clinical reports of success with the closely related organism *H. influenzæ*.[131] Preliminary claims for success in *trachoma* [115] have been recorded.

Sulphamido-chrysoidin and Prontosil Soluble

The oral preparation sulphamido-chrysoidin is now almost obsolete. Clinical reports are now only of historical interest, for there is no reason to suppose that sulphanilamide cannot accomplish all and more than sulphamido-chrysoidin has to its credit. But there are certain clinical states in which a soluble preparation for injection, such as prontosil soluble, has advantages—namely, when an immediate effect is required, when swallowing is difficult, when nausea and vomiting are prominent, or when absorption from the alimentary tract is insufficient to ensure an adequate concentration in the blood. With all present-day soluble preparations absorption and excretion are rapid; multiple injections are therefore required. In cerebro-spinal infections the "red prontosils" penetrate from blood to theca more slowly than sulphanilamide,[101] and in urinary infections the excreted product is only a urinary antiseptic in so far as the compound has been reduced to sulphanilamide.

Benzylaminobenzenesulphonamide (Proseptasine) and Soluseptasine

The benzyl compound, proseptasine, is much less soluble than sulphanilamide. Compared with sulphanilamide it is far less toxic to animals [86] and, to judge from clinical reports,[87 158] less toxic to the human subject. It is equally active [173] or almost equally active [83 80] against experimental hæmolytic streptococcal infections but appears to be inactive against meningococcus [173]; yet clinically it has given good results against the last-named organism.[87] Its efficiency in animals is increased by powdering finely.[130] The compound has not been fully studied from the biochemical point of view, save that its action is not due to reduction to sulphanilamide. Nothing is known about what concentration in blood or in other fluids is obtainable or is necessary, or whether lack of toxicity is due simply to slow absorption owing to insolubility.

Clinically the drug is effective in erysipelas,[145] streptococcal tonsillitis,[158] and other streptococcal infections. Successes have also been claimed in meningococcal meningitis [87] and in a number of other infections, and in my own hospital two cases of cervical actinomycosis have responded dramatically to the drug. On account of its safety this benzyl compound appears to have a useful place in clinical medicine for the less severe hæmolytic streptococcal infections. When a case is desperate or urgent, sulphanilamide is the compound of choice; but in many milder cases the benzyl compound is to be preferred.

The same remarks apply to the soluble product, soluseptasine. This colourless substance is in my own experience completely non-toxic. Indeed I have given as much as 80 c.cm. intravenously in twenty-four hours to a human subject without any toxic effect. Experimentally soluseptasine is active against *Streptococcus hæmolyticus* [173] but not meningococcus; clinical reports, however, include successes not only in streptococcal infections and meningococcal infections,[87] but even in influenzal meningitis.[164] The results are at least the equivalent of those with prontosil soluble. No observations have been made concerning effective concentration in the blood, though activity is apparently due to rapid reduction to sulphanilamide within the body.

Uleron

This compound, which is not broken down to sulphanilamide, was reported by Domagk [54 55] to be

effective against staphylococcal infections in mice and rabbits. To judge from clinical reports, it is now the most widely used remedy in Germany for the treatment of gonorrhœa. A survey of the German and English records suggests that it is more toxic than sulphanilamide. Almost everyone who has used it in any quantity or in a large series has noticed the occurrence of polyneuritis.[72 116 168] This has also been produced experimentally.[98] In this country, now that the optimal method of treatment of gonorrhœa with sulphanilamide is being seriously investigated, it is doubtful whether uleron will ever come into wide use except perhaps for sulphanilamide-resistant cases.

M. & B. 693

The importance of 2-(*p*-aminobenzenesulphonamido) pyridine (M. & B. 693) is that it is highly active against pneumococcus[176] of several types and yet also is as active as, if not more so than, sulphanilamide against *Streptococcus hæmolyticus*[176] and meningococcus. Thus the range of activity has been increased. Its activity, compared with that of sulphanilamide, against meningococcus and *Staphylococcus aureus* is shown in Tables I–III, and similar results have been obtained by others with *Staph. aureus*[130] as well as good results in *Bact. coli* septicæmia of mice.[130]

Such preliminary clinical reports as are available confirm the activity of M. & B. 693 in *pneumococcal pneumonia*.[37 61 69 165] More dramatic have been the two reported cases of pneumococcal meningitis[147 150] and one other of which I have personal knowledge.[10] To these significant successes may be added a number of unpublished cases, in my own experience and in the experience of others,[58] and in pneumococcal septicæmia.[57] Those who undertake investigation in pneumonia during the coming winter should test their patients for bacter-

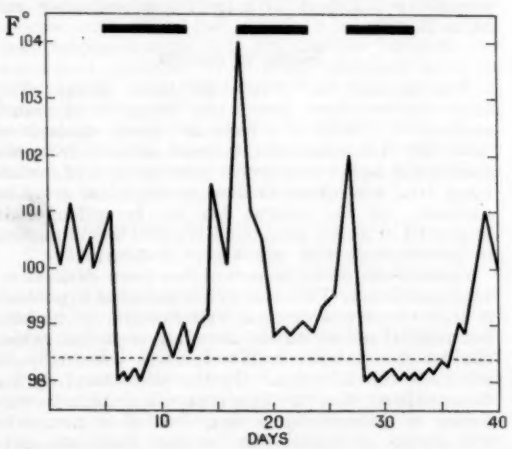

FIG. 2.—Temperature chart showing influence of M. & B. 693 on fever associated with subacute bacterial endocarditis due to *Str. viridans*. The periods of administration are indicated by the black rectangles.

æmia, because bacteræmia will supply the best information for assessment.

One successful case of *staphylococcal septicæmia* has been reported,[64] and I have knowledge of three others.

With *meningococcus* no survey of its effect in meningitis has yet been attempted, but I understand that such a trial is contemplated[10] owing to encouraging results in isolated cases; a successfully treated case of meningococcal septicæmia has already been reported.[50]

M. & B. 693 appears to have an action on *Streptococcus viridans*, an organism which cannot be satisfactorily tested in laboratory animals. I have tried the drug empirically in three cases of *subacute bacterial endocarditis*, all proved by blood culture. Two were advanced cases with embolic phenomena, in which cure was neither anticipated nor obtained; yet in both cases life was undoubtedly prolonged, and the clinical improvement in general health and comfort, as well as in the secondary features such as anæmia, was as pronounced as the obvious effect on the fever. Fig. 2 shows the effect of the first three courses of M. & B. 693, but in three subsequent courses the effect became less and less beneficial. On this I shall comment when I consider the mode of action of these drugs.

Other encouraging unpublished reports concerning

TABLE I—EFFICIENCY OF DRUGS IN MENINGOCOCCAL INFECTION IN MICE

Drug	Dose of drug* in mg.	Bacteria†	Mice	Mice dying on day							Mice surviving 7 days	Average survival in days
				1	2	3	4	5	6	7		
Lethal control	–	10^3	6	1	1	0	0	0	0		4	4·8
	–	10^5	6	3	1	1	0	1	–	–	0	1·2
	–	10^7	6	0	3	3	–	–	–	–	0	1·5
M. & B. 693	20	10^7	6	0	1	1	0	0	0	0	4	5·2
	40	10^7	6	0	0	0	0	0	0	0	6	7·0
Sulphanilamide	10	10^7	6	0	1	0	1	0	0	0	4	5·3
	20	10^7	6	1	3	1	0	0	0	0	1	2·0

* Drug administered at time of inoculation, 5 hours later, and once on following day.
† Meningococcus + 0·75 c.cm. mucin (intraperitoneal).

TABLE II—EFFICIENCY OF DRUGS AGAINST *Staph. aureus* INFECTION IN MICE

Drug	Dose of drug* in mg.	Bacteria	Mice	Mice dying on day							Mice surviving 28 days	Average survival in days
				1	2	3	4	5	6	7		
Lethal control	–	150	6	3	0	0	0	0	0	0	3	14
	–	15,000	6	6	–	–	–	–	–	–	0	0
	–	1,500,000	6	6	–	–	–	–	–	–	0	0
M. & B. 693	40	15,000	6	0	0	0	0	0	0	0	6	28
	40	1,500,000	6	0	0	0	0	0	0	1	0	14
Sulphanilamide	20	15,000	6	2	0	0	0	0	0	0	4	20
	20	1,500,000	6	0	4	0	0	0	0	0	2	10

* Drug administered at time of inoculation, 7 hours later, twice daily on 2nd, 3rd, and 4th days, and once daily on 5th, 7th, 8th, and 9th days.
† Two died on 15th, two on 17th, and one on 18th day.

TABLE III—COMPARISON OF EFFICIENCY OF M. & B. 693 AND SULPHANILAMIDE AGAINST STAPHYLOCOCCAL INFECTION IN MICE

Drug	Dose in mg.	Bacteria	Average survival in days (maximum 28)
M. & B. 693	20	15×10^3	26
	20	15×10^5	17
	40	15×10^3	26
	40	15×10^5	16
Sulphanilamide	10	15×10^3	22
	10	15×10^5	15
	20	15×10^3	20
	20	15×10^5	13

Lethal controls with these doses of bacteria have all a survival figure of less than 1 day.

M. & B. 693 deal with experimental work with *Pasturella pestis* [156] and a case of *H. influenzæ* meningitis [10] which recovered with M. & B. 693 after sulphanilamide had failed. A remission in a case of pemphigus [11] has been observed, and the drug has been found effective in gonococcal ophthalmia [135] and gonorrhœa.[6 19] Experimentally, the drug is inactive against *H. pertussis*.[46]

The complete field of activity is as yet unexplored, and it would be hasty to claim too much before M. & B. 693 has passed that proper phase of clinical assessment which it undoubtedly deserves. Even if it is eventually found to have no more than an action on all cocci, it will have a greater chance of success than sulphanilamide when used empirically without a bacteriological diagnosis.

TOXICITY AND ADMINISTRATION

The pharmacology and toxicology have been fully studied in lower animals,[177] in which the drug has been found to be extremely non-toxic, to have no action on

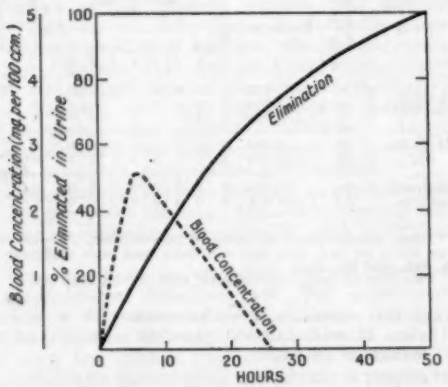

FIG. 3.—Graphs showing absorption and excretion of M. & B. 693 after a single dose of 1 g. in a normal person. The concentration of the drug in the blood is given in milligrammes per 100 c.cm.; the elimination is estimated as total of free and conjugated forms. (By courtesy of Mr. E. J. Baines.)

blood, and to produce no porphyrinuria. This is in doses which are sixteen times the effective curative dose for mice. Yet we know from experience with sulphanilamide that these animal results may not be applicable to man. A series of 100 pneumonia patients [61] was remarkably free from toxic effects with the exception of cyanosis. In my own experience, and in the experience of others, there have as yet been no more serious toxic effects than cyanosis, nausea, and sometimes troublesome vomiting, which last is a disadvantage because M. & B. 693 is soluble only to the extent of 1 in 1000 and cannot therefore be given by injection. Vomiting appears to be due to local irritation in a sensitive stomach and not of central origin. If the first doses are retained and an improvement in the clinical state occurs, vomiting is rarely troublesome; it is as though the stomach, itself deranged by the febrile illness, were unable to "stomach" the drug. There are various devices for overcoming this. Some patients take the preparation better when it is powdered and suspended in milk, some when it is powdered and placed in rice-paper capsules, and some when sodium bicarbonate or some gastric sedative is administered simultaneously. An injection of a suspension in olive oil, put up in ampoules of 2·5 c.cm., each containing 0·5 g., is the only alternative when vomiting is persistent. This slightly painful method of administration is efficient in experimental animals and effective in human beings; it is useful to tide over the initial gravely ill phase when all organs are deranged by the toxins of the infection.

As to dosage, the principles used in the treatment of acute infections with sulphanilamide appear to give the best clinical results—i.e., a relatively high initial dose followed by a sufficient regular four-hourly dose to maintain the blood level at an adequate concentration. For pneumococcal pneumonia I have been accustomed to give 5 g. in the first twelve hours, in lots of 2 g., 2 g., and 1 g. four-hourly, followed by 1 g. four-hourly, making a total of 23 g. in a week. With this dosage, the concentration in the blood usually reaches about 8 mg. per 100 c.cm. in the first twelve hours and is maintained at this figure throughout the course of treatment; the blood contains no drug twenty-four hours after ceasing treatment, but the urine contains traces for some forty-eight hours.

Despite its relative insolubility, the drug is rapidly absorbed, even more rapidly than sulphanilamide, and it is excreted somewhat more slowly (Fig. 3). The drug is excreted in about equal proportions of free drug and conjugated acetylated form. When estimations of excretion are made, the acetylated form has first to be hydrolysed before it will give the usual amino colour-test.

In mice the curative blood level for massive pneumococcal blood-stream infections is 15–25 mg. per 100 c.cm., whereas for streptococcal infections the lower blood level of 7–15 mg. per 100 c.cm. is sufficient. Clearly, the optimum dosage for particular infections requires to be fully studied in the human subject. I anticipate that for many clinical states the effective dosage will be found to be lower than is at present commonly practised with both sulphanilamide and M. & B. 693.

Mode of Action

The manner in which all these drugs exert their action has been the subject of much study.[17 40 67 68 107 120] Were it clearly understood how they act, one could forecast activity from the theoretical aspect and evolve some method of preliminary trial less laborious than an empirical assay on animals. At the present day the invention of an improved or a new compound requires a combination of perseverance with much good fortune.

Opinion on mode of action has been divided on two main issues. The most widely accepted hypothesis is that the drugs exert a bacteriostatic or perhaps bactericidal action on the invading organism, which enables the natural bodily defences eventually to eliminate the infection. On the other hand, it has been claimed that the drugs have a definite detoxicating or immunising action, that they neutralise hæmolysins or leucocidins, or that they stimulate phagocytic activity [153] and other parts of the natural defensive mechanism.

Most studies have been concerned with sulphanilamide in relation to streptococcal infections. There is now ample published evidence that sulphanilamide exerts an in-vitro bacteriostasis and in higher concentrations a bactericidal effect,[40 95] and the important fact that the drug has no deleterious effect on leucocytes has also been determined.[67] The drugs act on only limited numbers of organisms,[40] and certain common constituents of laboratory media may prevent the action altogether.[114] The most convincing in-vitro tests are those in which whole blood [40 68]

or deleucocyted blood has been the test medium, from which it has been concluded that sulphanilamide [40 95] and M. & B. 693 [67 68] are active against small numbers of organisms at concentrations in blood which can be obtained therapeutically. When properly standardised, in-vitro testing should be a useful preliminary to laborious in-vivo tests. At present there is a lack of parallelism between the two methods. Thus prontosil is active in vivo but not in vitro,[40] whereas sulphanilamide is active against pneumococcus in vitro but not in vivo,[23] and in my own experiments with M. & B. 693 this lack of parallelism has been still more evident. Mice which receive a dose of 2 mg. of M. & B. 693 have a blood concentration sufficient to enable the shed blood to kill pneumococci in vitro, yet a dose of 30–40 mg. is necessary to save life; on the other hand, this small 2-mg. dose will save the life of mice infected with streptococci, but the shed blood is quite inactive against the organism in vitro.

It was early noted [109 110] that sulphanilamide had some action on streptococcal capsules, and more recent work with M. & B. 693 [165 176] has confirmed this in the case of pneumococcus, an organism with a more easily identified capsule. Certain in-vitro tests have been said to show inhibition of toxin production,[110 134] but such tests are capable of alternative interpretation [75] and have been disputed [82 99]; indeed, if these drugs inhibit bacterial multiplication, they must naturally inhibit toxic activities which depend fundamentally on multiplication.

Others have claimed that the drugs neutralise endotoxin [112 113]; others that they exert an opsonic action.[28 65] Nevertheless, whatever criticism may be made of such specific claims, it is obvious that, if we are fully to understand the remarkable specific action of these drugs, the questions concerning specific stimulation of the immunity mechanism of the body, or of the drug being identical with the specific antibodies, had to be explored. Indeed, that sulphanilamide will differentiate between the serological grouping of a single organism such as β-hæmolytic streptococcus [18 95] is an astounding example of specificity. For a considerable time, in conjunction with Prof. James McIntosh, I have been investigating this aspect of the case, and it will suffice here for me to indicate what the trend of our publication on that subject promises to be.

RELATION TO IMMUNITY MECHANISM

The discovery of the activity of M. & B. 693 against pneumococcus greatly increased the opportunity of settling these fundamental points by reason of the inherent properties of the pneumococcus itself. The immunity created by infection with pneumococcus is more durable and estimable than that obtained with streptococcus. Mice cured of a pneumococcal infection are afterwards immune to further inoculations with living cocci. It has therefore been possible to compare the immunity created in animals, cured with M. & B. 693 after inoculation with live cocci, with the immunity created by orthodox methods of specific active immunisation with vaccine. We have compared not only the degree of immunity but also the speed with which this immunity is produced.

In our experiments it has been quite clear that these drugs are not leucocytic stimulants, which agrees with the findings of others.[76 132] Animals which are going to die after infection with pneumococci have always leucopenia. Those which are going to live have an almost normal count, not a leucocytosis. From this it is fair to deduce that the drug, by inhibiting coccal multiplication, not only prevents toxic depression of the marrow from an overwhelming infection but also leaves the marrow unstimulated. Cocci inoculated into the peritoneal cavity always invade the blood stream even in animals which have been treated prophylactically with the drug, and in the peritoneum of prophylactically treated animals the pneumococci always multiply for a period of about seven hours. At the end of seven hours the cocci within the peritoneum show capsular degenerative changes. We have been unable to confirm the observation that the capsular degeneration is associated with loss of type-specificity and virulence.[165] The immunity created in animals cured of a living infection by M. & B. 693 appears to be fundamentally the same both in *quantity*, *quality*, and *speed of production* as the immunity created by orthodox active immunisation. In typhoidal infections in mice the same result has been obtained. Furthermore, the immunity produced is a function of the inoculated dose just as in orthodox active immunisation, being greater when large doses of living cocci are inoculated and smaller when small doses are used; it is unrelated to the dose of drug.

A survey of our unpublished experiments confirms the now generally accepted hypothesis that these drugs are not specifically concerned with the immunity mechanism. Hence it would be most unwise to jettison all those devices for producing specific immunity which have been a stand-by for so many years. Here again is opportunity for the art of medicine—the proper division of patients into those who, with the assistance of these drugs, will eliminate the infection themselves, and those who will require also the assistance which tried methods of specific immunisation can give.

A "LAG" PHENOMENON

In a large number of in-vivo and in-vitro tests with M. & B. 693 and pneumococcus one feature has been so constant that it has seemed of considerable importance—i.e., that the drug is not instantly bactericidal nor even instantly bacteriostatic. Animals which receive the drug prophylactically so that they have a high concentration of the drug in the blood at the time of intraperitoneal inoculation with pneumococci nevertheless suffer blood-stream invasion as well as blood-stream multiplication. This goes on for some hours; yet in twenty-four hours the infection is at an end. In vitro also this curious "lag" phenomenon is found. If one takes the serum of animals which contains an adequate concentration of M. & B. 693 and incubates this with a reasonable inoculum or even a very small inoculum of living pneumococci, some multiplication of the organism always occurs over periods up to six hours; yet in twenty-four hours this bacteriostasis has progressed to the point of extinction. Now, bacteria, like human beings, may perish not only from poisons but also from starvation and inanition. It is this "lag" phenomenon which suggests that inanition may be the cause of the bacteriostasis.

The delayed action of the drugs in vivo and in vitro clearly indicates that they do not act immediately on the primary inoculum, that during the first six hours of contact, while the drug is being slowly adsorbed on to the organism, some multiplication of the bacteria occurs, but, as adsorption progresses, multiplication becomes more and more difficult and eventually ceases. Does this not suggest that food assimilation, which is so essential for rapid bacterial multiplication, is hindered? That some factor essential for reproduction is inassimilable? This seems much more likely than that the drugs are

direct protoplasmic poisons, which tend to combine instantly. Indeed, in a whole series of experiments I have been unable to find any evidence that M. & B. 693 is altered or fixed either quantitatively or qualitatively by contact with bacteria, even if the drug has exerted its action. Any combination that there is between drug and bacterium must be extremely loose. It may well be, therefore, that these drugs block some "receptor" part of the bacterium, so that it is unable to use properly essential foodstuffs. I use Ehrlich's word "receptor" deliberately, for I visualise a combination between drug and bacterium which is a loose type of adsorption, which is that intricate type of jigsaw-puzzle fitting together of molecules, which bacterial chemists are exploring so profitably to explain the phenomena of immunity; work which is firmly establishing the original immunity theory of Ehrlich.

POSSIBLE EVOLUTION OF RESISTANT STRAINS OF BACTERIA

The obvious defence for bacteria against drugs with this type of action would be the quick evolution of insensitive individuals, so-called resistant strains. We have already some clinical evidence that such strains exist and that such individuals can be evolved. We know that acute infections are the most amenable to treatment; that, if the infection is to be eliminated completely, it must be eliminated quickly; and that, when repeated courses of these drugs are required, the chance of success is lessened. The effect in gonorrhœa must also be remembered: in many cases dramatic and instant cure; in others a recrudescence of the infection, which is then resistant to drug treatment or at least to treatment with the same drug, but which may respond to a change of compound. And I have already indicated that M. & B. 693 appeared to become progressively more inactive on *Streptococcus viridans*. This is highly suggestive that resistant or insensitive individuals may be developed. It gives a hint for the clinical field—i.e., that, if the first course of a drug is not completely successful, it might be as well to use a different drug for a second course.

The unravelling of the intricate mode of action of these drugs will require the coöperation of bacteriologists, chemists, biologists, and those engaged in clinical practice. If the tentative suggestions which I have put forward contain no more than a grain of truth, it is nevertheless certain that complete studies of the metabolism, nutrition, and chemical structure of bacteria themselves are those most likely to provide the key to the intelligent and full understanding of the whole science of chemotherapy.

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PULMONARY NEW GROWTHS

PATHOLOGY, DIAGNOSIS, AND TREATMENT*

BY R. C. BROCK, M.S. Lond., F.R.C.S.

ASSISTANT SURGEON TO GUY'S HOSPITAL AND TO THE BROMPTON HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST

(*Concluded from p. 1044*)

Malignant Tumours

It is almost certain that all carcinomas arising in the lungs are of bronchial origin and that none arises from the actual alveolar epithelium. Indeed, it is still doubtful whether the air sacs have a complete lining or whether the scattered cells covering the capillaries are mesodermal (Fried 1932). Most lung growths arise obviously and certainly from a bronchus; there are some, however, which form a mass in the substance of the lungs, perhaps peripherally, perhaps surrounding and invading the hilum, in which there is no direct evidence of a primary bronchial connexion. The relation to the bronchi may be only one of compression and destruction. Nevertheless, histologically there is no distinction between such growths and those that arise frankly from a large bronchus. There is no reason to suppose that a small subsidiary bronchus or even bronchiole cannot give rise to a primary carcinoma, and as soon as the tumour grows to any appreciable size it would begin to destroy all direct evidence of its site of origin.

CLINICAL COURSE AND DIAGNOSIS

A full account of the clinical course of bronchial carcinoma is impossible here and I can refer to only a few points. In many cases the diagnosis is easy and certain; in others it is extremely difficult or impossible during life. The latency is at times remarkable and, indeed, the patient may die after even a relatively long illness without at any time developing symptoms referable even to the thorax, let alone the bronchial growth itself. The danger of overlooking an obstructing growth when an empyema is present must again be emphasised. During the last five years I have seen at least a score of cases of empyema in which the diagnosis, even the possibility, of an underlying growth has been completely overlooked. Usually advice is sought only when the drainage from the operation wound shows no sign of stopping and when the patient's general condition begins to deteriorate. Although I use the term "empyema," very often no true empyema exists but drainage has been made into a large lung abscess and the track leads directly into the obstructed lung itself. It is most important in such a case that the correct diagnosis should be made and futile operations to close the sinus avoided. The logical treatment is to unblock the bronchus, and after this has been done by means of radon the sinus may heal spontaneously and the patient live for a year or more.

I am passing over the accessory methods of investigation of the chest, such as contrast radiography and bronchoscopy, and am proceeding at once to a consideration of exploratory thoracotomy. When every clinical and laboratory method of investigation has been carried out it may still be impossible to make a diagnosis with certainty. Even when the size and physical characters of a mass make malignant disease almost a certainty,

* Hunterian lecture delivered at the Royal College of Surgeons of England, 1938.

unless actual histological examination has been obtained there is always a chance that an innocent condition is being overlooked. In general surgery it is a sound principle that a mass of obscure nature should be explored even if there seems no reasonable alternative to the diagnosis of advanced malignant disease. Countless patients with carcinoma of the stomach or colon undergo laparotomy on the basis of hope and exclusion, and it seems unreasonable not to extend a similar chance to sufferers from apparently advanced intrathoracic growth.

It is, of course, useless to suggest exploration in by far the greater proportion of cases, as for instance those with obvious mediastinal involvement. There is no doubt, however, that the step of exploratory thoracotomy should be recommended more often than it now is. In proper hands the operation carries but little risk and is scarcely any more burden than the much-used exploratory laparotomy. Elderly patients stand it well and a simple intercostal incision is far less of a burden to them than an incision through the abdominal wall. I have performed 15 exploratory thoracotomies for growth with only 1 death and that three weeks after operation from a pulmonary embolus.

PROGNOSIS IN UNTREATED CASES

As with malignant disease anywhere else in the body it is impossible to assess the duration of bronchial carcinoma before symptoms appear; indeed, very often the first symptoms are due to metastases or secondary extensions rather than to the original tumour. It is important, however, to try to assess the expectation of life once symptoms have appeared. Although wide variations occur and occasionally long periods of survival are noticed—especially in older patients—the general consensus of opinion is that the time is short and rarely more than six months.

TABLE I—TIME OF SURVIVAL IN BRONCHIAL CARCINOMA

—		Cases.	Survival (months).		
			Average	Longest	Shortest
Kikuth	1925	..	6–12	36	1
Powell and Hartley	1911	..	9	..	..
Sonnenfeld ..	1928	..	..	36	7
Miller and Jones ..	1930	..	..	36	14
Maxwell and Nicholson	1929	84	10·9	..	..
Jackson and Konzolmann	1934	..	..	18	3
Chandler and Potter	1927	61	6	..	..
Sears	1934	26	6	..	..
Leddy and Vinson	1932	29	5	..	..
Hunt	1929	26	6	17	1½
Tuttle and Womack	1934	44	18	60	2

Fried (1932) states that the average duration of the disease is two years but this is taking into account a possible long latent period before symptoms appear. Many writers merely agree that the expectation of life is short and only a matter of months. Davidson (1930) states, in an analysis of 107 cases at the Brompton Hospital, that from the time of admission to the time of death was only eight weeks. This is an incomplete observation but it serves a purpose. Others give complete figures and these are shown in Table I. It should be noticed that, with the exception of Tuttle and Womack's figures, the average survival in all cases is less than a year and more nearly six months. Occasional cases of survival for 18 months up to three years are met with, but they are exceptional. I shall later mention a proven case of my own which survived nearly eight years. In Tuttle and Womack's series there are two cases of survival for as long as five years. Most of these chronic forms of the disease are due to low-grade squamous-celled carcinoma of the main bronchi in elderly men.

It is abundantly clear that although any given patient may survive as long as a year or even more, in general he will die within about six months. In some cases death comes swiftly in the course of a few weeks from the first sign of disease. So definite is this shortness of the expectation of life that in patients surviving over a year doubt should always be entertained as to the correctness of the diagnosis. Few clinicians would disagree with this statement.

OPERABILITY

The general unsuitability of bronchial carcinoma for surgical extirpation follows as a matter of course from this consideration of the expectation of life. Apart from the large number of patients who, from age or frailty, are not suitable subjects for major intervention, in many the first sign that anything is wrong may come from either a secondary deposit (for instance in the brain) or from some secondary extension such as paralysis of the recurrent laryngeal nerve. Rogers (1932) found that in 44 per cent. of cases studied post mortem the first symptom of disease had come from secondary deposits rather than from the primary lesion.

In my own experience malignant disease of the lung is a most disappointing condition to treat even when seen comparatively early. Although prompter and more expert investigation will certainly discover a few more operable cases, this number will always be small and will not affect the main observation that the condition is essentially and disappointingly unamenable to treatment. Age is important in this connexion. In young patients and those in early middle life, in whom the development of bronchial carcinoma is often such a terrible tragedy, every clinician will agree that the patient almost always shows some symptom of definitely fatal import very early on in his illness.

Out of four patients under 35 on whom I have performed exploratory thoracotomy, in not one has the growth been operable. I have seen a patient of 28 in which excision was carried out, but death occurred in less than a year from secondary dissemination. In two young men in whom I explored the chest within three weeks of the first and only symptom, full of hope that an early diagnosis had been made, I found that mediastinal invasion was already far advanced, showing strikingly the difficulties of the situation as met with surgically.

During the last 15 months I have kept a list of all cases of bronchial carcinoma which I have been asked to see. They number 106. Of these, 83 or 78 per cent. were hopeless and beyond any useful treatment and, in fact, most had been so from the beginning of their illness. This was partly on account of obvious secondary deposits or local spread rendering operation useless, partly on account of age or poor general condition which prevented operation in some cases which would otherwise have been operable, although these were not many. In a few of these I did advise palliative X ray treatment.

In 10 cases I advised local radon therapy and in all but 3 of these it was merely as a placebo. In 13 cases I thought exploratory thoracotomy was worth doing although success did not seem likely in more than 5 or 6. Of these 13, 4 refused operation and in only one of these did there seem a fair chance of

removing the growth. Of the remaining 9 who consented to operation, 5 were inoperable and in 4 the growth was removed.

In a personal communication Dr. R. H. Overholt (Boston) tells me that out of 70 cases of bronchial carcinoma he himself has studied he has explored 27. Of these, 11 were found to be inoperable; in 16 the growth was removed. Dr. W. F. Rienhoff (Baltimore) similarly states in a personal communication that he finds about 80 per cent. of cases inoperable at the time of exploration.

Although my analysis of the operability of bronchial carcinoma is so gloomy, I do not want to give the impression that surgical vigilance should be relaxed. This very rarity of hope should only spur us on to watch for and recognise those few cases in which successful treatment may be possible. To adopt a purely fatalistic attitude to each individual case merely from the general unsuitability is both narrow-minded and unprogressive.

DEEP X RAY THERAPY

A careful assessment of the true value of this method of treatment is most important since for the great majority of sufferers from malignant disease of the lung it offers the only hope of relief. It is extremely difficult to give a definite and final opinion on its value owing to many factors that obscure the issue and because most reports of its use are loose and unscientific. The recognition of the benign polyps during the last five years has revealed another cause of confusion in collective investigations. This is amply proven by numerous articles in which benign tumours have clearly been unrecognised. Kernan (1933) describes 10 cases diagnosed as bronchial carcinoma, 6 of which are almost certainly instances of benign tumour. Manges in 1932 gave his results in 21 cases of malignant disease, some of which he stated had survived as long as 8, 7, and 6 years. In 1934, however, he reviewed this group and states that in the light of fresh knowledge 5 were benign polyps which, of course, accounted for all the long periods of survival.

The value of any particular form of treatment may be assessed in two ways: (1) by personal views; (2) by statistics. The drawbacks of the statistical methods are well known, and the personal method, although having no precision, often influences us more than whole lists of statistics.

Personal views.—Almost all authorities are unconvinced that any good follows the treatment for bronchial carcinoma. Tudor Edwards (1931), although he has seen temporary disappearance of a growth in one case, says that otherwise he has seen no improvement, much less cure. Evarts Graham (1934) is similarly unimpressed with its efficacy. Davidson (1930) states that deep radiation has a definite value, but the benefit is only temporary and the treatment is merely palliative. Other authors say that pain is relieved and much clinical improvement follows and, although death has not been delayed, the end has been more merciful.

Statistics.—Leddy and Vinson (1932) give the experiences of the Mayo Clinic in 71 cases, all diagnosed by biopsy after bronchoscopy. Of 29 in whom no treatment was given, all were dead in an average of five months. Of 42 who were treated by X rays or radium, 32 lived an average of eight months. Of 10 who had X rays alone, the survival period ranged from 15 months to four years, the average time being 23 months. They conclude that life is definitely prolonged.

In 1927 Chandler and Potter analysed 120 cases, 61 of which received no treatment and died in an average time of six months. Of the 55 who were treated by deep X rays, 51 died in an average time of eleven months; of the remaining 4, 3 were shown to be wrongly diagnosed. Chandler and Potter did not feel that the treatment was in any way effective, but the success in one case was so striking that they continued their trial of the method and in 1935 Chandler, Finzi, and Maxwell published a follow-up of a further 70 patients, 44 of whom were treated by deep X rays. Of these they considered 23 showed great improvement, 7 slight improvement, and 14 no improvement at all. They concluded that the treatment had no great effect in prolonging life except possibly in rare cases, but that it could definitely relieve the more urgent and distressing symptoms in about two-thirds of the cases and could cause local disappearance of the tumour.

I am personally unconvinced that deep therapy has played any real part in the prolongation of life in certain of these cases that have survived for as long as three and four years and of which there were two or three in Chandler's group. There is a type of bronchial carcinoma to which I have already alluded which is very slow growing and which has a long and chronic course; I refer to the squamous carcinomas of the larger bronchi. I believe that, even untreated, these patients may survive many years unless severe infection supervenes.

A patient recently came into one of my beds at the Brompton Hospital who first attended in January, 1930, and had had symptoms since the end of 1929. His condition was diagnosed as a carcinoma of the lung and no treatment was advised; the radiographic appearance was characteristic. After discharge he went back to work and continued so until a short time before his readmission in 1937 when I removed a piece of the growth at bronchoscopy and it was shown to be a squamous-cell carcinoma. He died nearly eight years after his first symptom and, if he had been treated by deep X rays or any other means, would have been claimed as a strikingly successful result.

It would appear from a consideration of all the views expressed that *in general* the use of deep therapy is not followed by any reasonable improvement. At the same time, however, there is ample evidence to show that in *certain individual cases* great benefit may follow, either symptomatic without marked prolongation of life or with a long period of survival accompanied by temporary recession of the tumour. The chance of such an improvement in any individual case will always lead to recommendation of its use so long as there is no other reasonable or possible line of treatment in 90 per cent. of the patients who are found to be suffering from the disease. At the same time we must remember that if we cannot do good we must not do harm. In cases where much suppuration or exudate-filled lung is present or where there is a large mass of growth, I do not believe that anything but harm can result. I find it difficult to believe that a large mass of growth either primary, or secondary in the mediastinum, can be adequately irradiated so as to receive a lethal dose without the patient himself succumbing.

I have had only one case illustrating the rare success that encourages one to advise the method in some cases. It was that of a young man whose chest I explored in December, 1936, and found an inoperable growth, proven by biopsy. He was given treatment by Prof. Woodburn Morison at the Cancer Hospital and the whole mass disappeared. He went back to work in apparent good health, but has just returned with a recurrent mass in the lung.

INTRABRONCHIAL RADON

Intrabronchial radon has the advantage that its local effect does not produce the severe constitutional

disturbances that deep X rays may do, although it is much more limited in its application.

The earliest report that I can find of its use in bronchial carcinoma is by Yankauer in 1922, who used 8 short applications of radon (50–60 mc.) in a container left attached by a string and pulled out after 4–5 hours. The patient was alive and comfortable 8 months afterwards. In 1924 Greene recorded a case treated as a bronchial carcinoma by interstitial implantation of the radon. Following these isolated reports, no serious attempt was made to prosecute the method until Tudor Edwards introduced the use of a special radon seed container in 1929. These containers are now widely used and play a valuable part in treatment. They consist of a metal container in the form of a tube so that secretions and air can pass through the lumen. The seeds are held in grooves in the wall.

In using this method cure is not aimed at but merely local destruction of the growth so that a blocked bronchus may become unblocked, a collapsed lung be allowed to expand, and infection either be prevented or relieved by the free drainage that results. The actual bronchial growth itself often produces no symptom; the first sign that anything is wrong comes with an attack of "pneumonia" or "influenza" which is due to infection behind the growth. It is this infection persisting and increasing which is often responsible for most of the patient's symptoms and is often the direct cause of his death; a lobe or a whole lung being converted into little more than a bag of pus. Unblocking the bronchus by radon allows drainage, and subsidence of the infection, relief of pain from pleurisy, and the most dramatic improvement in the patient's general condition often follow.

Tudor Edwards, in 1934, reported his results in 32 patients and stated that several were alive after periods of 2–3 months to over a year; the majority had, however, died of their growths. Ormerod (1937) analysed 100 cases of bronchial carcinoma, 72 of which he treated with radon. A few of these were strikingly successful: one man was at work 4 years 8 months after treatment; another was alive after 2 years 10 months; two were at work after 18 months; and two more were alive after a year. Of patients who died, one lived over 4 years and two others 2 years. The average life of the untreated cases was 3½ months; of the treated 7¾ months.

I have found myself that the indications for radon are far fewer than Ormerod suggests. As opposed to his 72 per cent., in my own series of 106 patients I only used it in 10 and, in 7 of these, merely as a placebo, since obvious metastases were present. Perhaps I have been too conservative, but I confess I cannot bring myself to use it on a patient who has a large primary mass or such definite mediastinal or visceral involvement that early death is inevitable.

In my own 25 cases the results have been similar to those of other workers. I have had one patient survive for 21 months and three for 1 year. These four cases were in the group of squamous-cell carcinomata to which I have already referred. In one case the local effect of the treatment was striking when compared with the complete lack of effect on a few outlying glands that were invaded with growth and had not been irradiated. It therefore occurred to me that, whereas up to now we had been using radon not with the idea of producing a cure but rather of affording drainage to an obstructed lobe, we should seriously consider the possibility of aiming at a real local cure in certain selected and favourable cases; these would naturally tend to be in the squamous-cell group.

In the radium treatment of malignant disease elsewhere in the body, efforts are always made to irradiate the lymphatic field serving the growth and there is no reason why this should not be tried in these squamous-cell carcinomas of the main bronchi. So far we have been content to place a tube in the lumen of the growth and do no more. The disposition of the large bronchi clearly allows more than this, for by insertion of further tubes in the same bronchus and into the bronchus of the opposite side at a later date, as shown in Fig. 7, a wide field of irradiation can be secured which covers the lymph gland groups in each of the three main spaces. Wherever a growth may be situated, one or all of these groups need irradiating. I have so far used this method in too few patients to be able to draw any conclusions, except that the case which has survived longest (21 months) was treated in this way and died of secondary deposits in the opposite ribs with never any sign of local recurrence; unfortunately no post-mortem was obtainable.

DIRECT IMPLANTATION OF RADON AFTER THORACOTOMY

The indications for exploratory thoracotomy have already been discussed. When a growth is found and extirpation is not possible, in a certain number of cases radon seeds may be implanted. Where there is extensive hilar or mediastinal involvement their use is, of course, scarcely indicated because early death is inevitable. J. E. H. Roberts mentions the case of a man with a large growth who survived 3½ years and improved enough to go back to work. Tudor Edwards (1934) reports the largest number of cases. Out of 41 patients submitted to thoracotomy, 27 had radon seeds inserted. Excluding 2 patients who died within 10 days and those who were still alive, the average length of survival was 12 months after operation.

RADICAL EXTIRPATION

When faced with an illness caused by a malignant tumour, the minds of most—surgeon and layman alike—turn at once to thoughts of radical removal.

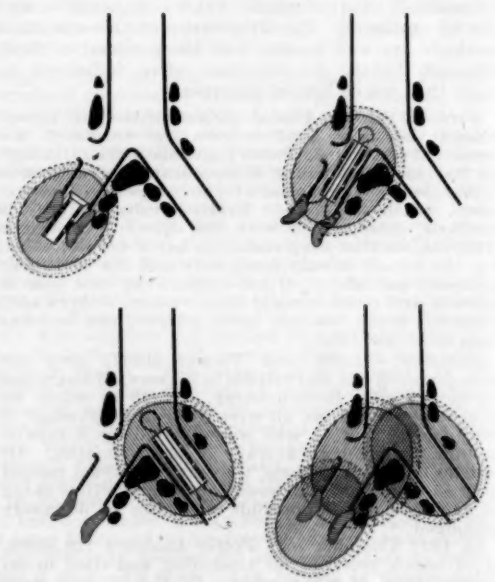

FIG. 7.—Diagram of suggested scheme of radon therapy.

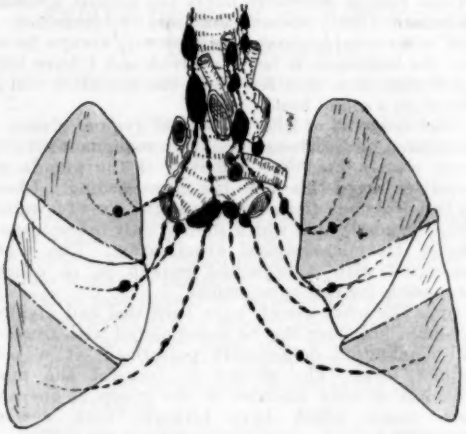

FIG. 8.—Scheme of lymphatic drainage of lungs to show arrangement into three main groups, *not* corresponding to the individual lobes. (After Rouvière.)

The difficulties in the way of achieving this in bronchial carcinoma are considerable, for fully 90 per cent. of patients who present themselves are already beyond help. It is rare to find that a growth which appeared doubtfully operable before exploration is really removable. Until five years ago radical removal was rarely attempted owing to the prohibitive mortality, but lately vigorous attempts are being made to solve the problem.

With the advent of successful lobectomy for bronchiectasis, it was inevitable that new attempts should be made on malignant growths. From simple lobectomy there has been progression to radical pneumonectomy. Although the groundwork and experience gained in lobectomy for bronchiectasis has been invaluable, the problems to be faced in malignant disease are quite different; this is not surprising considering the complete dissimilarity between the two conditions.

The attempts at radical attack on bronchial carcinoma have followed the same path that has been taken in cancer of almost every other organ in the body. Thus, the very simplest and crudest efforts in any organ have been by a simple local excision of the tumour or its destruction by caustics or the cautery; later by wider but still only local excision of the affected organ. In the breast the results of these incomplete attacks were so bad that many surgeons considered that no attempt should be made to treat a malignant growth surgically as recurrence always followed and often with greater misery for the patient. The development of the more scientifically planned operation of radical removal of the organ and its lymphatic field has changed this outlook and has, indeed, achieved brilliant success. Whereas in most other viscera this evolution of treatment is a matter of surgical history, we can trace the development of the same process during the last few years in bronchial carcinoma.

I have found accounts of some 75 cases in which various incomplete attempts have been made to extirpate a bronchial carcinoma; the methods cover cautery-pneumonectomy, resection of quite a small part of a lobe, or sub-total lobectomy. The mortality in this group was high and the recurrence-rate equally disappointing. In fact Graham (1934) could find only six recorded cases in which the patient had survived the surgical removal of a carcinoma for more than a year. It fell to Graham himself (in 1933) to perform the first successful pneumonectomy for carcinoma, using the tourniquet technique. The patient, a physician, made a good recovery and returned to his practice.

In all these cases the attempts at excision were sub-total or incomplete. Often portions of growth were left behind and no effort was made to deal with the lymphatic field. In no other part of the body is cancer treated by limited local excision, and there is no reason why we should depart from the fundamental principles governing the surgery of cancer in our treatment of carcinoma of the lung. Our surgical minds would revolt against deliberately treating an early operable carcinoma of the breast by simple mastectomy, but there are many to-day who are still in the stage of thinking of the treatment of carcinoma of the lung by sub-total lobectomy. Such a procedure was excusable in the early days when we were groping for knowledge of what we can do or cannot do, but is now quite unacceptable and should be abandoned except in a few special cases. Where age or certain other attendant circumstances make a more elaborate procedure undesirable, sub-total lobectomy or pneumonectomy may still be employed for certain peripherally situated tumours, but for other than these exceptional cases it should not be used. As I have already pointed out, in almost every reported case death has followed from recurrence within a year. In one personal case the unsatisfactory result of an incomplete operation was shown by death from recurrence 18 months after removal; the patient had been able to return to full work.

LYMPHATIC DRAINAGE OF THE LUNG

It is impossible to consider the radical surgical treatment of carcinoma of the lung without considering the lymphatic drainage. It is impossible to go into this fully here, but I will emphasise the two facts which I consider of first importance.

(1) The lymphatics of the lung do not run in groups corresponding to the lobes. The lymph trunks which run between the lobes are fed by vessels from the two neighbouring lobes. This is shown in diagram in Fig. 8 (after Rouvière 1932) in which it can be seen that each lung can be divided into three lymphatic areas which are made up of portions of the various lobes, the right middle zone, for instance, being formed from parts of upper, middle, and lower lobes. The interlobar fissures do not act as partitions but rather as watersheds for the lymphatics on each side.

(2) The lymph connexions are free, and there may be a rapid passage of malignant cells to glands a long way off, such as to the higher right paratracheal group from a growth of a left lower lobe.

It is clear that it is not possible by even a total lobectomy to eradicate the lymphatic vessels and lymph glands connected with one particular lobe. The lymphatic spread is so free that only by total pneumonectomy, after dissection of the main vessels, can we hope to remove a reasonable amount of the glandular area. Before considering dissection pneumonectomy, we must discuss radical lobectomy more fully.

RADICAL LOBECTOMY

Right lung.—Although this is not in general desirable, one must sometimes be content with a radical lobectomy rather than pneumonectomy. Whenever it is decided to attempt total excision of either the upper or lower lobe with the dissection

of the vessels, the middle lobe should always be simultaneously removed. This is for two reasons:—

(1) A much more complete removal of the related lymphatics is achieved by avoiding opening up the interlobar fissure which contains lymph vessels and lymph glands associated with both lobes.

(2) Chances of finding a complete separation of the two lobes right down to the vessels is small, because the opposing lung tissue of the two lobes usually blends in the deepest part and numerous vessels anastomose across the junction. The problem of these vessels is evaded by taking the middle lobe as well.

FIG. 9.—Specimen of bronchial carcinoma removed by total or dissection lobectomy of right upper lobe with simultaneous removal of middle lobe. Note complete nature of removal of upper lobe with lymph glands.

Fig. 9 shows a specimen of carcinoma removed by such a radical lobectomy. This operation was performed in February, 1935, and is, therefore, one of the earliest attempts at true radical removal.

Left lung.—As a result of numerous dissections of the individual vessels of the lobes of the left lung, I have formed the opinion that it is too difficult and unsatisfactory to do a set total excision of either lobe with dissection of the vessels. The origins of the individual branches are so close to each other and to the point of bifurcation of the left main bronchus that separation is unsafe, and moreover dissection of the fissure would involve separating directly through the potentially invaded lymphatics.

The importance of the lymph glands and lymph vessels in this situation is constantly forced upon one in lobectomy for bronchiectasis when they are almost always found large and inflamed and obtrude themselves markedly when the fissure is being cleared. It cannot be satisfactory to open up this plane of tissue in malignant disease.

TOTAL PNEUMONECTOMY

In the Jacksonian essay in 1935 I put forward the thesis that the correct radical operation for bronchial carcinoma whenever possible is total pneumonectomy, after dissection of the vessels, and combined with removal of the adjacent lymph glands. I feel complete confidence not only in repeating but stressing this statement. It is now the acknowledged procedure amongst all thoracic surgeons who have studied the problem properly. To many it may sound a drastic step to advise, but this is not so. Bronchial carcinoma is no gentle process and no less radical procedure offers the patient a chance of cure. Total pneumonectomy by dissection is still a formidable procedure and will always be so, but the technique is being evolved and I have little doubt that in a very few years the operation will be placed on a sound basis.

The removal of the associated lymph glands is important, and, although definitely malignant involvement clearly precludes removal, if the glands are merely enlarged this is no bar to proceeding. I have on two occasions dissected a gland the size of a walnut from the aortic arch which showed only inflammatory change on microscopical examination. The sepsis associated with a bronchial growth is, of course, responsible for this enlargement.

Once the main vessels have been tied and divided, the main bronchus can be manipulated with freedom and transection deliberately performed at a convenient level. The ability to transect the main bronchus at once includes in the group of operable cases many which have hitherto been deemed inoperable.

For a growth in the upper lobe the best surgical approach is considered to be from the front; when the lower lobe is affected, the standard postero-lateral thoracotomy enables one to deal with basal adhesions which would be quite unmanageable from the front. Many of the details of the operation still remain to be worked out, and these can only be completed by pooling of the experiences and thought of many workers.

After a few years we may find the operation is so severe and carries so little increased expectation of life that it is not worth while continuing, but I have little fear that this will be so. It is far too early to give complete statistics, and survival-rates are not yet possible. I have, however, been able to obtain the latest figures of three surgeons who have probably the greatest number of cases to their credit and I think this better than recording a longer list of ones and twos from many workers (Table II).

TABLE II—OPERATIVE RESULTS FOR TOTAL PNEUMONECTOMY

Surgeon.	Total cases.	Patients surviving operation.	Remarks.
Tudor Edwards	11	6	All 6 still alive without evidence of recurrence.
Overholt ..	13	9	Seven still alive without evidence of recurrence.
Rienhoff ..	18	12	*First series:* One-stage operation.
	12	12	*Second series:* Two-stage operation, the pulmonary artery being tied at the first stage to allow compensation. No deaths.

Rienhoff's series of 12 consecutive cases without a death is truly astonishing and is a powerful argument in favour of his two-stage procedure in which the pulmonary artery alone is ligated at the first operation, the veins and bronchus being dealt with at the second stage. Credit is due to Rienhoff for performing the first one-stage total or dissection pneumonectomy for growth in July, 1933, although the lesion in this case has since been recognised as a benign tumour. The results of these surgeons encourage us to continue our efforts in this rather heart-breaking but important field of surgery.

(*References at foot of opposite page*)

RELIEF OF PAIN IN LARYNGEAL TUBERCULOSIS

WITH SPECIAL REFERENCE TO IONISATION *

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PAIN, often agonising and persistent, which prevents the swallowing of all forms of food is the worst symptom to be treated in tuberculous laryngitis and often taxes our ingenuity.

When food cannot be taken in the usual way, it is always worth trying moderately thick fluids sucked through a straw with the head hanging down (Wolfenden's position). Drugs will often relieve pain when it is not very severe, and all of the following are worth trying:

Aspergum (aspirin chewing-gum, White's Laboratories).

Anesthone tablets (Parke, Davis and Co.).

Euphagin tablets (Homburg Pharma and Co.—benzocaine 0·1 g., menthol 0·0025 g., and sodium borate 0·05 g.).

Trochisci krameriæ et cocainæ B.P. (cocaine gr. 1/20 in each tablet).

Insufflation of anæsthetic powders—Orthoform (Bayer) and benzocaine equal parts, applied through a Leduc's tube or insufflator, gives more relief than either separately.

A 5 per cent. cocaine spray (DeVilbiss or Chiron spray).

If the pain is due to the passage of food over an ulcer of the epiglottis, incision of the epiglottis by diathermy or the scalpel may give complete relief. Electrocautery or diathermy of sensitive spots on the larynx may be useful. Injection of the superior laryngeal nerve (Hoffmann 1908) can be tried but often fails to relieve dysphagia. In view of this and the fact that other nerves also participate in the sensory nerve-supply of the larynx Stott (1936) suggests the usual injection at the point where the superior laryngeal nerve pierces the cricothyroid membrane; the infiltration of the neighbourhood of the posterior belly of the digastric muscle from the point where it joins the anterior belly (both of these injections can be made through the same puncture); or injection of the mylohyoid nerve according to the technique used in dental surgery for the inferior dental nerve but at a suitably lower level. These two injections can be undertaken on both sides if required. It is rarely necessary to repeat the treatment more than once a week. The choice of anæsthetic is a matter of preference. Both Hoffmann's and Stott's techniques require skill in performance and do not always relieve the pain.

* Abstract of a post-graduate lecture delivered at the Royal Southern Hospital, Liverpool.

IONISATION

Ionisation or electrical anæsthesia (Grain 1936) has given the most satisfactory results in my experience. The current is produced by a 45-volt dry battery and controlled by a reducing coil and a milliammeter. The electrodes are of malleable conducting metal, the anterior electrode being 3 in. long and 1½ in. wide and the posterior 4 in. long and 1½ in. wide. They are covered with layers of lint at least ¼ in. thick when wet, which overlap the edge of the metallic electrode. One electrode is soaked in a 2 per cent. solution of potassium iodide and linked with the negative pole; the other is soaked in pure water and connected with the positive pole. The negative electrode is placed over the larynx and the positive over the nape of the neck; they are held in position by elastic bands. The intensity of the current is uniformly 10–12 ma. It is best to begin with 4–5 ma. and only to go cautiously above 9 ma., for there is danger of burning the skin, especially if the pad does not completely cover the metal as described above.

Applications last for half an hour each and are repeated daily until the anæsthesia lasts twenty-four hours, after which they are repeated when the pain recurs. There is no advantage in daily applications when the anæsthesia lasts forty-eight hours. As soon as the current passes, the patient notices a sensation of stricture in the neck and at the same time an inky or coppery taste in the mouth, accompanied by increased salivation. The feeling of stricture passes off in four or five minutes, but the taste and the salivation persist. The pain is usually abolished at the end of fifteen minutes. The patient is free from pain for twenty-four hours or more after 6–7 applications, and then occasional applications—e.g., once a week or once a fortnight or at even longer intervals—will maintain this relief. Grain (1936) does not claim that the treatment is curative, but considerable healing has taken place in two of my cases, in one at least in spite of extensive and advancing pulmonary disease.

SUMMARY OF CASES

CASE 1.—Male with extensive ulceration of larynx. Pain was not relieved by drugs. Complete anæsthesia persisted for twenty-four hours after 7 applications. After 15 applications there was no pain until death three days later. Patient was very highly strung, educated, sceptical about treatment, and loth to discontinue treatment when pain went; he said it was the "only thing 100 per cent. efficient."

CASE 2.—Male with extensive ulceration. Pain was not relieved for more than a few days by bilateral block of the superior laryngeal nerves. Complete anæsthesia persisted for twenty-four hours after 6 applications, and pain did not return before death five days later.

(*Continued from previous page*)

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CASE 3.—Male with extensive ulceration. Pain was not relieved by drugs. There was complete relief after 8 applications until death three days later.

CASE 4.—Male. Pain was not relieved by trochiscus krameriæ et cocainæ. There was complete relief after 5 applications until patient was discharged at his own request thirty-six days later.

CASE 5.—Male with ulceration of left vocal cord, interarytenoid region, and half right cord; epiglottis swollen and infiltrated. Patient never obtained more than six hours' relief after an application; he developed iodine rash and slight burns on his neck. Treatment was stopped after 11 applications because little relief was obtained.

CASE 6.—Female with infiltration of entire left cord and interarytenoid region. Pain was not relieved by drugs. There was complete relief after 21 applications and for five weeks before patient was discharged on her own responsibility. This patient would not usually tolerate more than fifteen minutes, and the milliamperage also had to be kept low.

CASE 7.—Female with ulceration and swelling of right arytenoid and vocal process. Pain was not relieved by drugs. There was relief for over thirty hours after 10 applications, then for the following periods: forty-eight hours; forty-eight hours; four, eleven, eleven, twelve, ten, fourteen days, and finally up to patient's discharge on her own responsibility sixty-two days later. The larynx appears to be healing, in spite of progressive disease in the lung.

CASE 8.—Female with ulceration of entire right side of larynx. Pain was not relieved by drugs. There was three hours' relief after the first application, then six hours' after the second and third; after which she complained that it made her throat feel contracted and did not relieve the pain, so it was stopped.

CASE 9.—Female with swelling of both arytenoids and a large ulcer. Pain was not relieved by drugs or spray. Partial relief was obtained for not more than three hours after 6 applications.

CASE 10.—Male. There was no relief from pain until several applications had been made and then only for six hours at the most. Treatment was discontinued after 7 applications.

CASE 11.—Female with epiglottis almost entirely destroyed by disease. Both arytenoids and the aryepiglottic fold were swollen. Pain was not relieved by drugs. Ionisation produced considerable relief for various periods up to seventy-two hours, and then for nine weeks up to the present time. The larynx is healing, but extensive bilateral disease in the lungs has not improved.

SUMMARY

Electrical ionisation for the relief of pain in tuberculous laryngitis is simple, without danger if ordinary care is taken, cheap, and completely effective in most cases over long periods.

My thanks are due to Dr. W. Crane, medical superintendent of Fazakerley Sanatorium, for permission to publish these cases and to Mr. J. McGibbon, visiting laryngologist, for help and encouragement in carrying out this treatment and in the preparation of this paper.

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ROYAL WEST SUSSEX HOSPITAL.—The Duchess of Kent visited Chichester on Oct. 26th and received purses and other contributions amounting to £2300 in response to the appeal which had been made by Lord Leconfield, the Lord-Lieutenant of Sussex, on behalf of this hospital. The money raised is to be used to pay for the new X ray apparatus, and to enable the governors to use legacies for capital expenditure and not as general income. The hospital serves an area of nearly 350 square miles, and maintains a service which costs £18,500 annually. For the past eleven years expenditure has exceeded income by an average of £1500 per annum.

ANALYSIS OF THE NORMAL QRS DEFLECTION

BY ATHELSTANE HILL, M.D. Camb., M.R.C.P. Lond., D.P.H.

CARDIOLOGIST TO PAIGNTON AND DISTRICT HOSPITAL AND TO NEWTON ABBOT HOSPITAL

WHILE trying various chest leads it was noticed that whenever three leads were taken in the usual order from any three points, the sum of the first and third was always equal to the second. In connexion with the standard leads this fact has usually been explained by the familiar doctrine of the equilateral triangle. But since it is impossible that three points taken anywhere at random should always form an equilateral triangle in any conceivable sense, some other explanation is needed.

If we think of the chest wall as a hollow shell or band of conducting material, filled with relatively non-conducting lung, it will follow that the deflections given by a galvanometer standardised in the ordinary way will be approximately proportional to the difference of potential between the points of application, provided that there are no gross differences of resistance in the paths through the chest wall between any pairs of points chosen, and that the resistance of the galvanometer is not small compared with that of the total circuit. In other words, by applying a suitable correcting factor, the galvanometer can be used as a voltmeter. On this assumption it should be possible to plot out roughly the distribution of potential on the surface corresponding with each of the main events in the heart cycle.

METHOD OF INVESTIGATION

The subject was a healthy, muscular male, aged 22, with no clinical sign, symptom, or history of disease or abnormality of the heart or lungs; blood pressure 122/74 mm. Hg, pulse-rate at rest 72. His standard electrocardiogram is shown in Fig. 1.

Twelve approximately equidistant points on the chest were chosen, as follows (Fig. 2):—

1 and 2. *Subclavicular*, on the second rib, 1 cm. internal to the nipple line on each side.
3. *Apex* } in the fifth space directly below the
4. *Liver front* } subclavicular points.
5 and 6. *Scapular*, 7 cm. from the midline, between the levels of the fourth and fifth vertebral spines, on each side.
7. *Angle* } directly below these, and level with
8. *Liver back* } the two lower anterior points.
9 and 10. *Axillary*
11 and 12. *Lower axillary* } in the midaxillary line on each side, on the same levels as the upper and lower anterior and posterior points.

The eight anterior and posterior points were regarded as forming the angles of a cube, and leads were taken along all twelve edges of this cube, and along both diagonals of each of the six faces. Eight more leads were taken from the axillary and lower axillary points to the nearest points on the front and back; and each axillary point was connected with the lower axillary point on the same side. These 34 leads provided 28 triangles, which made it possible to synchronise them with a fair degree of accuracy. In addition to these, 14 more leads were taken from points where there was reason to suspect a steep potential gradient to some fixed point at a distance.

In this way the third rib, fourth space, and sixth rib on each side were compared with the nearest anterior point; and points just below the lung

margin at the back were compared with the angle and liver back points immediately above them.

Incidentally it was found that the instrument apparently records the potential of the point immediately beneath the connecting screw.

The Cambridge jelly type of electrode was used; it is 6 cm. long and 3·5 cm. wide, with a connecting screw 1 cm. from one end. For both the leads shown in Fig. 3 the right-arm electrode was placed on the right scapular point; in both the centre of the left-leg electrode was over the second left space 1 cm. internal to the nipple line. But A was taken with the connecting screw above the centre, over the second rib, while for B the electrode was turned round, with the screw over the third rib.

FIG. 1.—The patient's standard electrocardiogram.

RESULTS

The terms "positive" and "negative" are used throughout in the ordinary electrical sense. An upward deflection in any standard lead means that the first-named electrode is negative to the second-named; thus, during the inscription of an R deflection in standard lead I the right forearm is negative to the left forearm. In S of lead II the right forearm is positive to the left leg.

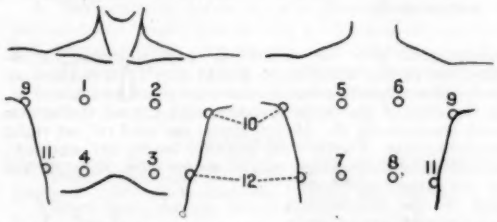


FIG. 2.—Approximate positions of the twelve chief points.

The duration of the Q R S in this subject was approximately 0·08 sec., and analysis shows five distinct phases (Fig. 4). The first, third, and fifth are relatively static, showing changes in voltage but little change in distribution; the other two phases are transitional between these.

Phase 1 begins with the appearance of a positive area near the left subclavicular point. Fig. 4 A shows the distribution about 0·01 sec. later; this corresponds in time with the stimulation and contraction of the papillary muscles (Barker and others 1929).

Phase 2 coincides with the stimulation of both apices simultaneously. The apex and left lower axillary points change from negative to positive; the most negative point is first at the left scapula, then the right scapula, and finally, as shown in Fig. 4 B, below the right clavicle.

Phase 3.—The apex and precordium generally now become strongly positive. Below the third rib on the left, the front of the chest is positive to the back, but in all the other quadrants there is a sudden reversal, and the back becomes positive to the front, except that the front and back of the liver are almost iso-electric. Both subclavicular regions become intensely negative, and in some cycles they are iso-electric. Fig. 4 C shows the distribution at the peak of this phase, which corresponds with the stimulation of the apical two-thirds of both ventricles (Lewis 1925).

Phase 4 is marked by the appearance of a second negative focus at the apex, separated from the original focus (which is now at the left subclavicular point) by a positive band stretching forward from the positive focus at the angle of the left scapula. The voltage has fallen to about one-fifth of its value during the third phase. This phase is shown in Fig. 4 D.

Phase 5.—Fig. 4 E shows this final phase, when the whole of the right ventricle and the greater part of the left ventricle have passed into full contraction, and have therefore ceased to generate contraction current. The only source of contraction current at this time is the basal part of the left ventricle.

DISCUSSION

The charts of these phases can be correlated with the known anatomy and physiology of the corresponding events by simple electrical principles. One example will suffice to make this clear.

Fig. 5 shows the conditions obtaining in the ventricles during Phase 3. The stimulus has reached

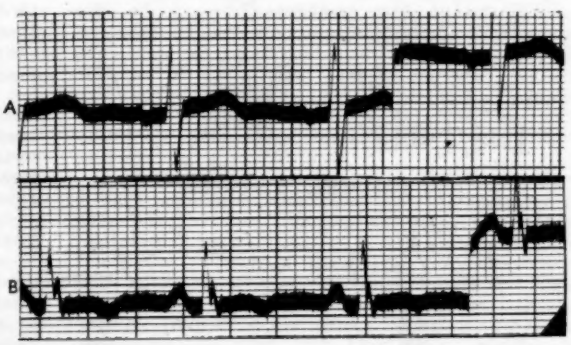


FIG. 3.—Showing the effect of inverting an electrode. The upper tracing (A) was taken with the connecting screw above the centre of the left-leg electrode, over the second rib, while for (B) the electrode was turned round with the screw over the third rib. For both leads the right-arm electrode was placed on the right scapular point.

the apices and has swept upwards along the endocardial surfaces of both ventricles, starting a contraction wave at each point as it passes. The contraction wave, shown by the dotted line, is travelling outwards from the point of stimulation to the epicardium; consequently the epicardial surface of the active area is positive, and the endocardial surface negative. If the heart were embedded in a sphere of uniformly conducting material—see Fig. 6A, in which the conventional battery sign has been substituted for the heart—a galvanometer, standardised in the usual way, would give (1) a maximum deflection when the electrodes were placed at A and A′, in the line of the heart's axis; and (2) no deflection with leads along the dotted lines, BB′ and CC′, at right angles to this. Further (3) parallel leads, DD′ and EE′, would give deflections of the same sign, though not of the same amplitude; and (4) the summation rule would apply only to three leads when the angles between them fulfilled certain conditions.

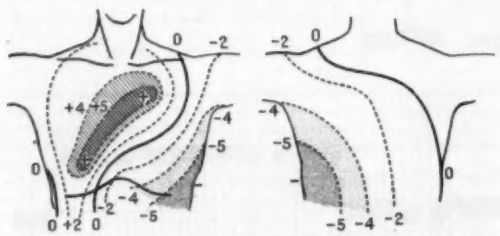
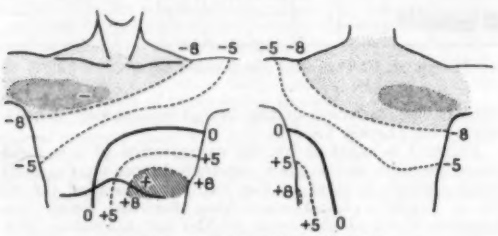
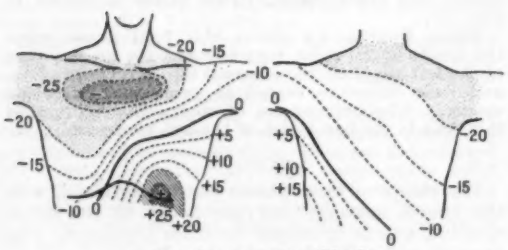


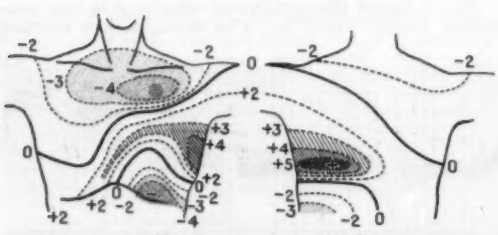
FIG. 4A.—Contour lines, in decimillivolts, are drawn in on the (inaccurate) assumption that the potential gradient is uniform between the observed points. Total range, 1·2 millivolts. The most positive observed is marked +, the most negative −. The more positive areas are shaded, the more negative stippled.



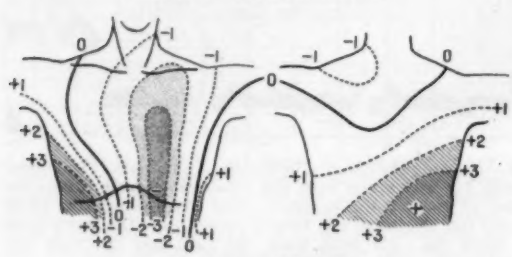
B—Total range, 2·0 millivolts.



C—Total range, 5·6 millivolts.



D—Total range, 1·2 millivolts.



E—Total range, 0·8 millivolt.

FIG. 6A

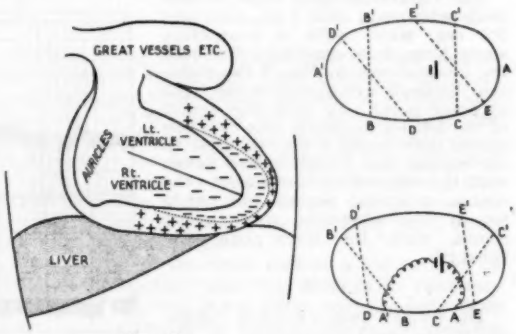


FIG. 5 FIG. 6B

FIG. 5.—Conditions in the ventricles during Phase 3.

FIG. 6.—Diagrams showing the points that would give maximum deflections (AA′), and no deflections (BB′ and CC′), if the heart were (A) embedded in a sphere of uniformly conducting material, and (B) suspended in a hollow shell.

Some such concept seems to underlie the doctrine of the equilateral triangle, and is certainly implied by the term "axis-deviation."

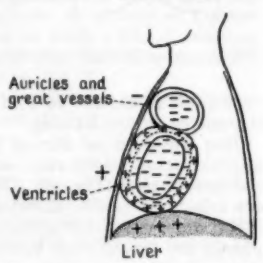


FIG. 7.—Diagrammatic sagittal section. + = point of maximum positivity. − = point of maximum negativity.

But if, as already suggested, we think of the chest as a hollow shell with which the heart is connected by certain definite paths of low resistance at the precordium, at the liver and, through the auricular appendages and the great vessels, at the subclavicular regions, none of these four conditions will apply (see Fig. 6B). The points giving maximum deflection, A, A′, bear no necessary relation to the orientation of the battery in space; the lines, BB′ and CC′, joining iso-electric points are not parallel, or at right angles to any axis; parallel leads DD′ and EE′ will give deflections of opposite sign; and, within limits, the summation rule will hold good with any three triangulated leads. The diagrammatic sagittal section in Fig. 7 shows the application of this concept to Phase 3 and Fig. 4C.

Normal, air-filled lung is relatively non-conducting; but "compression," de-aeration, or congestion of the

left lower lobe will bring the apex and left ventricle *electrically* much closer to the left shoulder: this may be an important factor in the production of left axis-deviation.

This method of analysis might be expected to throw light on the mechanism of some pathological conditions—e.g., abnormal Q waves and bundle-branch block. Examination of the T wave in this subject has led to some suggestive results, which must be reserved for another occasion.

SUMMARY AND CONCLUSIONS

1. Charts of the potential distribution on the surface of the chest throughout the heart cycle suggest that the current to which the electrocardiogram is due runs *round* the chest wall, and not *through* the chest as hitherto commonly assumed.

2. If this is so, the doctrines of the single "resultant current" and of the equilateral triangle will not be applicable; and the meaning of the term axis-deviation will need modification.

3. The Q R S shows five successive phases, which may be correlated with stages in the ventricular contraction on simple electrical principles; the mechanism of this is explained.

4. Interpretation of variations from the normal will depend on the phase to which they belong; normally the second and third phases are apical and bilateral in origin, and the fifth phase is due to activity of the base of the left ventricle alone.

5. Reference is made to the possible influence of extracardiac conditions in the production of so-called left axis-deviation and right axis-deviation.

6. If chest leads taken on different occasions from the same patient are to be strictly comparable, great accuracy must be observed in applying the electrodes.

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NITROUS OXIDE IN MIDWIFERY

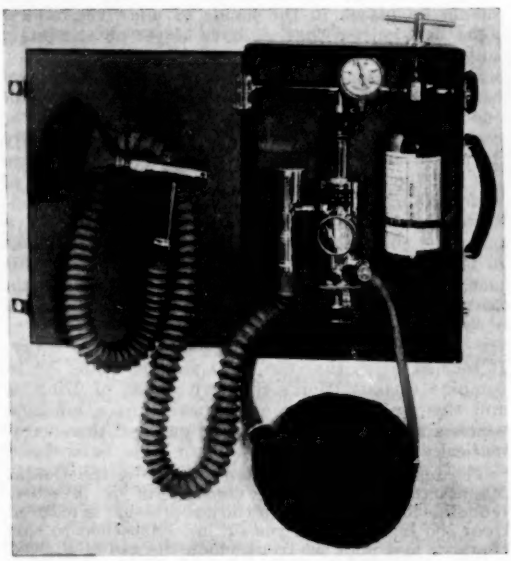
A NEW MACHINE

By J. E. ELAM, B.A. Camb., M.R.C.S.
VISITING ANÆSTHETIST TO WELLHOUSE HOSPITAL, BARNET

IN the five years since gas-and-air analgesia was introduced at the Wellhouse Hospital maternity unit, the total number of patients making use of it has been 1808, 1053 being primiparæ and 755 multiparæ. Of the primiparæ 645 experienced no pain after gas and air was started, 399 found great relief, and 9 were disappointed; of the multiparæ 418 experienced no pain, 329 found great relief, and 8 were disappointed. Our figures show a higher percentage of success than has been obtained in most hospitals, which can be explained, I believe, by the trouble that has been taken with the administration. The degree of analgesia can only be assessed from the opinions of the patients themselves, but we have been careful to explain to patients anxious to please that they will not be helping us by giving an exaggeratedly good report, and that we really do want their candid opinions.

Gas-and-air analgesia has now been adopted in the great majority of maternity hospitals in this country and in many places abroad. Unsatisfactory results in hospitals and nursing-homes are usually the fault of those in charge of the administration. In many hospitals which I have visited I have found machines hopelessly out of order, face-pieces which did not fit, and rubber tubing perished, and the administrators had often not taken the trouble to master the technique, simple though it is.

In spite of the difficulties of domiciliary midwifery a high degree of success has been obtained from the use of gas-and-air analgesia in the home. The Central Midwives Board have ruled that a midwife who has been trained in the use of gas and air can administer it to her own patients, provided that a second responsible person is present, and that the proportion of nitrous oxide does not exceed 45 per cent. Dr. R. J. Minnitt in his published results gave the percentage of nitrous oxide delivered by his machine as 35, which led to the 45 per cent. rule, but the Government chemists have recently shown that the percentage varies with the depth of the patient's inspiration and sometimes (with very shallow inspiration) rises as high as 70, and that it is only at a certain negative pressure, thought to represent an average deep inspiration, that a low percentage of gas is obtained. At the Wellhouse Hospital we have found that 60 per cent. nitrous oxide gives the best analgesia with no bad effects, and it is hoped that the Central Midwives Board will ultimately alter their ruling so as to allow this proportion.



Portable model of the "Wellhouse" analgesia apparatus.

Both in nursing-home and domiciliary midwifery I have sometimes found that the administrator is attempting to obtain complete *anæsthesia* rather than *analgesia* with each pain. On several occasions I have found the air-inlet of gas-and-air machines closed with sticking-plaster or the like and pure gas being administered to the patient. The danger of this practice cannot be too strongly emphasised. Pure gas anæsthesia with each pain, while causing no ill effect perhaps to the mother, if administered over even a short period, will almost certainly kill the baby.

NEW APPARATUS

To overcome our failures and at the same time protect the life of mother and child we have lately

been experimenting with a new method of administration. It had always been admitted that gas-and-air analgesia by itself will not give complete relief in those cases where the pains are very frequent and strong, because the patient has not time to get the benefit of the gas before the full severity of the pain is felt. Much can be done by giving sedative drugs early in labour, but it is doubtful whether these should be placed in the hands of midwives, and it must be admitted that we have as yet no absolutely suitable drug which could be used in every case.

Prof. Chassar Moir found that by giving two breaths only of pure gas instead of several breaths of gas and air relief could be obtained in the type of case where gas and air failed, and he has recently devised a machine which gives two breaths of pure gas and then nothing more. His machine consists of a slow-filling rubber bag holding 110 oz. of gas connected to a face-piece. When the patient feels a pain, she simply applies the face-piece and breathes in the contents of the bag. The objection to this method is that, when the 110 oz. has been used up, no more gas is available until the slow-filling bag is once more filled, so that in long pains the effect of the gas wears off before the pain has gone away. It seemed to us that the ideal method would be to combine Chassar Moir's idea with that of Minnitt, and this we have done. We have now a machine which gives two breaths of pure gas and then automatically gas and air.

The machine, which is made for us by the Dental Manufacturing Company, consists of a pressure-reducing chamber in which the gas pressure is reduced from 800 lb. to $\frac{1}{4}$–$\frac{3}{4}$ lb. per sq. in. Attached to this chamber is a pilot jet from which the gas is allowed to flow very slowly at a rate of about one gallon every two minutes. The pilot jet is connected with the rubber bag which fills slowly with pure gas. When the bag is full the pressure rises to $\frac{3}{4}$ lb. per sq. in., the same as that in the reducing chamber, and the flow of gas is stopped. The pressure-reducing chamber is also connected to a carburettor from which a mixture of gas and air can be obtained by the patient. The rubber bag and the carburettor are both connected by corrugated tubing to the face-piece. On the handle of the face-piece is a spring-release valve which allows the gas to flow when the face-piece is pressed on to the patient's face. The first two breaths which the patient takes empty the bag, and, when this is emptied, she inspires a mixture of gas and air through the carburettor. When she ceases to breathe in through the face-piece, an automatic device in the carburettor shuts off the flow of gas, which now flows slowly into the bag. Thus, between the pains, the bag is filling with pure gas so that all is ready for the next pain.

It is interesting to note that Karlson,[1] a Swedish anæsthetist, working independently, has come to the same conclusion as ourselves, and has produced a machine which, although in no way resembling ours, produces the same effects. It is too soon to say whether the new apparatus will be suitable for use by midwives without some medical supervision, but it is hoped that such will be the case, and we hope that with its aid we shall be able to obtain adequate relief for every patient.

We are indebted to the British Hospital for Mothers and Babies, Woolwich, Walthamstow Maternity Hospital, the Radcliffe Infirmary, Oxford, and the Middlesex and Guy's Hospitals for undertaking to test the apparatus. We have been assisted in the design of the machine by Mrs. Constance Tipper, D.Sc., and Mr. A. L. Bird, of Cambridge University engineering department.

[1] Karlson, S., *Acta obstet. gynec. scand.* 1938, **18**, 285.

Clinical and Laboratory Notes

PNEUMOCOCCAL MENINGITIS TREATED WITH SULPHANILAMIDE AND M. & B. 693

BY A. A. CUNNINGHAM, M.D. Dubl., M.R.C.P., D.P.H.
DEPUTY MEDICAL SUPERINTENDENT AT PARK HOSPITAL (LONDON COUNTY COUNCIL)

RECOVERY from pneumococcal meningitis has been so rare that great interest is attached to results from the new chemotherapy, particularly as specific serum therapy has not met with success. A fair number of instances are on record but in most of them the bacteriological evidence, so essential to correct diagnosis, is far from convincing.

Allmann (1937) reported recovery from a Type-III pneumococcal meningitis, presumably secondary to a chronic left otitis media of three years' duration, in a girl aged 15. After radical mastoidectomy and labyrinthectomy there was spontaneous recovery from the associated meningitis.

Frankmann and Stewart (1937) described meningitis due to a Type-II pneumococcus infection in a child aged 5, with recovery after hyperthermia from a blood transfusion.

Mertins and Mertins (1937) reported a mild Type-IV infection in a girl aged 13, left mastoidectomy being performed and Prontosil given by injection and sulphanilamide by mouth.

Latto (1938) published very briefly the successful treatment of a man aged 26, pneumococcus Type I being isolated on culture from the cerebro-spinal fluid obtained on the third day after treatment had been instituted with large doses of prontosil by mouth.

In the case reported by Caldwell and Byrne (1937) the pneumococcus was never isolated on culture from the cerebro-spinal fluid, but a positive precipitin test suggested a Type-I infection. Prontosil was given orally and by injection.

Finland, Brown, and Rauh (1938) of Boston have undertaken a detailed study of pneumococcal meningitis treated with sulphanilamide either alone or in various combinations with specific serum and complement. In their preliminary survey of ten cases there were six recoveries, the youngest patient being 7 and the oldest 19. The four fatal cases may be summarised as follows:—

1. Male aged 19, with a Type-XI pneumococcus infection which failed to respond to moderately intensive and sustained treatment for four weeks with sulphanilamide by the mouth, subcutaneously, and intraspinally. Autopsy revealed a frontal-lobe abscess with severe meningitis, but the accessory nasal sinuses and the ears were not affected. The causal organism was isolated on culture post mortem from the cerebral abscess and meninges.

2. A female aged 47 developed a Type-XXI meningitis two days after an extensive nasal operation. She was treated with sulphanilamide 4 g. daily for about three weeks, but the organism persisted in the cerebro-spinal fluid. Continuous lumbar spinal drainage was employed for several days but soon became impracticable.

3. A female aged 43 with a terminal Type-VII meningitis secondary to an unresolved broncho-pneumonia of four weeks' duration, died on the seventh day. She had been given sulphanilamide by mouth 9 g. daily for two days and then 4 g. daily for three days. This chemotherapy was supplemented by the intravenous administration of large doses of specific antipneumococcus horse serum without obvious benefit.

4. A child aged 3, suffering from a fulminating Type-IV meningitis secondary to a bilateral otitis media. She was given sulphanilamide 2 g. by stomach-

tube and then 1 g. four-hourly. The specific rabbit serum, given intravenously in repeated small doses, was badly tolerated. After two days' treatment the cerebro-spinal fluid became sterile on culture, but the child's general condition rapidly deteriorated and she died on the fourth day from the onset of meningitis. Mastoidectomy was not carried out, although the left ear was proved bacteriologically to be a focus of infection.

Two cases have lately been published from Wolverhampton: one patient aged 5 was treated with sulphanilamide by mouth (Young 1938) and the other, aged 7, made a dramatic recovery after chemotherapy with M. & B. 693 (Reid and Dyke 1938). In both of these cases the organism was isolated in pure culture from the cerebro-spinal fluid but was not agglutinated by any of the type sera available. More recently Robertson (1938) recorded quick recovery in a patient aged 14 treated with M. & B. 693, after Felton's serum and Soluseptasine had been tried without obvious clinical effect. The pneumococcus was isolated but apparently not typed.

CASE RECORD

The following case may be of particular interest in view of the patient's age and the severity of the illness.

A woman of 47 was admitted to the Park Hospital (L.C.C.) on August 5th, 1938, certified as cerebro-spinal meningitis. She had had an operation for the removal of nasal polypi on April 13th, 1938. At various times (in the years immediately preceding this operation and since then) she had been treated for severe frontal headaches and intermittent nasal discharge diagnosed as due to frontal sinusitis. On August 4th, 1938, she became suddenly ill with headache and vomiting and within twenty-four hours was removed to hospital.

On admission she was semi-stuporose with stertorous breathing, but very irritable and noisy at times, forcibly resisting all nursing and medical attention. A few petechiæ were noticed on the chest and upper arms. There was considerable neck rigidity with head retraction, Kernig's and Brudzinski's signs being positive. There was a slight aural discharge due to a bilateral external otitis. Lumbar puncture produced 10 c.cm. of turbid fluid under slightly increased pressure and containing 1360 cells per c.mm. A stained film showed Gram-positive diplococci, and culture grew pneumococci Type I.

Treatment was begun on the morning of August 5th with sulphanilamide 2 g. followed by 1·5 g. four-hourly, the tablets being crushed to a powder and given in suspension by nasal tube, feeding by mouth being impossible.

On August 6th the patient was more unconscious, although no sedative had been given since the previous evening. She continued to be resistive, but not to anything like the same extent as on the previous day. Breathing was still stertorous when the patient was not disturbed. Nasal feeding was continued, the fluid intake being supplemented by rectal salines, which were satisfactorily retained. Urinary retention necessitated catheterisation twice daily. Lumbar puncture yielded 10 c.cm. of turbid fluid. Pneumococci were seen on direct microscopical examination of the fluid, but the culture was sterile. Since the patient's condition appeared to have deteriorated, it was decided to try the effect of treatment with 2-(*p*-aminobenzenesulphonamido) pyridine—M. & B. 693—in view of reported benefit in pneumococcal infections. The initial dose, 2 g. at noon, was followed by 1·5 g. four-hourly by nasal tube.

Next day there was a slight but definite improvement in her general condition. She could be roused sufficiently from her lethargy to take a momentary interest in her surroundings, but her replies to questions were scarcely audible and quite unintelligible, although it was obvious that she could see and hear quite well. She had a definite squint due to involvement of the left sixth cranial nerve. A more or less constant headache with slight neck rigidity persisted. Nasal feeding was discontinued. Bladder sphincter control was again normal. An extensive herpes febrilis spread rapidly from both lips to the tip of the nose and to the left cheek. Lumbar puncture yielded 10 c.cm. of turbid fluid, containing 1520 cells per c.mm. A stained film showed pneumococci, but culture remained sterile. The following biochemical report was received:—

Cerebro-spinal fluid 8·5 mg. per 100 c.cm. (calculated as M. & B. 693).

Blood 15·5 mg. per 100 c.cm. (calculated as M. & B. 693).

On August 8th the patient was rational. Meningeal signs persisted in lesser degree. The patient, however, complained of attacks of nausea with retching and vomiting throughout the night. There was slight cyanosis of lips and nails. Lumbar puncture yielded 10 c.cm. of faintly turbid fluid, containing 380 cells per c.mm., 40 per cent. being mononuclears. The following biochemical report was received:—

Cerebro-spinal fluid 3·8 mg. per 100 c.cm. (calculated as M. & B. 693).

Blood 6·5 mg. per 100 c.cm. (calculated as M. & B. 693).

The fall in values was attributed to vomiting.

On August 9th the improvement in the general condition was maintained, but the attacks of nausea, retching, and vomiting persisted. The drug was reduced to 1 g. every four hours. Lumbar puncture yielded 10 c.cm. of clear fluid, containing 50 cells per c.mm., 85 per cent. being mononuclears. Culture proved sterile.

The continuance of nausea, retching, and vomiting, associated with marked cyanosis, indicated a toxic manifestation of the drug. The dose was therefore greatly reduced on this date and finally stopped on August 13th. Although all meningeal signs subsided, the temperature remained unsettled for several weeks, the patient complaining of headaches, frontal and occipital, from time to time. Repeated cultures from nose and throat did not reveal the presence of pneumococci. Radiography showed that the right frontal and maxillary sinuses were opaque.

DISCUSSION

Two drugs have been used in the treatment: sulphanilamide to a total of 15 g. over a period of thirty-six hours, followed by 2-(*p*-aminobenzenesulphonamido) pyridine to a total of 50 g. over seven and a half days. The patient, who was extremely ill on admission, recovered consciousness in about forty-eight hours and has made a good recovery. She is quite fit apart from the chronic sinusitis, which requires further treatment. It is impossible to assess clinically from this case the relative merits of the two drugs, but it is to be noted that the cerebro-spinal fluid on August 6th was sterile on culture before the second drug was given. It is also of interest to note the relatively low absorption of M. & B. 693 into the cerebro-spinal fluid, the content being about half that of the blood. This is in marked contrast with the relatively high concentration of sulphanilamide in the C.S.F., approximating closely to that in the blood, to be found in most patients with purulent meningitis treated with sulphanilamide (Banks 1938 and Allott 1938).

I have to thank Dr. H. S. Banks for advice during treatment and for permission to publish this case; Dr. J. E. McCartney and Dr. E. N. Allott for bacteriological and biochemical reports; and Messrs. May and Baker Ltd. for the supply of tablets.

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ABNORMAL REACTIONS TO ANÆSTHETICS

REPORT OF A CASE

BY JAMES L. O. TILLEY, M.R.C.S., L.D.S.

THE following report concerns a male patient aged 63, possessing a pleasant and cheerful disposition, with normal musculature and physique, and no important medical history or signs of alcoholism. He has undergone several minor operations —the setting of fractures and the extraction of teeth—in which various forms of anæsthetics have been administered, in each case by specialist anæsthetists of repute, yet his behaviour under the influence of each has been exceptional. For example:

First operation.—Put feet through window of surgery.

Second operation.—No operation performed. Patient found himself on floor of surgery.

Third operation.—Bit through watch-chain of anæsthetist, who declined to administer a second anæsthetic.

Fourth operation.—Broke harness made to hold him on operating table.

Fifth operation.—Dentist confined to bed for four days to recover from injuries received.

Before I attended the patient, I was given the most insistent warning with regard to his behaviour, and advised, for my own benefit, to verify and investigate his past history with respect to his reactions to anæsthetics. This I did, with the result that I engaged four strong male nurses.

On June 29th I operated at 8 A.M. at the nursing-home, in which the patient had slept the previous night to ensure physical and mental rest. For the operation Dr. L. Johnson administered Evipan, gas, and oxygen. The anæsthesia was quiet, the operation lasting 4–5 minutes. At 8.30 A.M. I saw the patient lying in bed in a thoroughly satisfactory condition. At 9 A.M. he started throwing himself about, and gradually became more and more violent. He struggled and fought with the four male nurses, and attempted to bite anyone or anything, at the same time making incoherent noises. The only possible way to keep him on the bed was to pass folded sheets over his chest and thighs, and round the bed rails. It was necessary to use this method of retention and for the assistants to exercise the greatest vigilance for about 1½ hours. At about 1.15 P.M. the patient suddenly asked for a chop, which he ate with avidity, and seemed to be as physically fit as on the previous day, with no signs of exhaustion or fatigue.

On August 31st I had to extract more teeth, and on this occasion only evipan was administered. The same convulsive and violent reactions followed, which might aptly be described as "demoniacal." On the assumption that Coramine increases the rate of excretion of the barbiturates, we decided to give him 3 c.cm., intravenously, which we were only able to do with great difficulty. About half an hour afterwards the patient recovered consciousness in the same abrupt manner as he had done on previous occasions.

It is my own and the anæsthetist's considered opinion that the patient's abnormal behaviour cannot be attributed to a neurotic disposition or to exhibitionism, as he actually did painful things to himself, and was unquestionably quite unconscious of his surroundings. I can only suggest that the borrowed strength shown might be in some way due to de-inhibition of the nervous centres governing his musculature. The strength exhibited by the patient was such that, had he been allowed to get out of his recumbent position, two men, however strong and muscular, could not have controlled him.

In conclusion, I might add that, in case of an accident, the patient has promised to carry with him a history of his behaviour under all kinds of anæsthetics including local anæsthetics, which, on the occasions of their administration, have proved nearly fatal.

London, W.

(*Continued from previous page*)

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NEW INVENTIONS

GALL-BLADDER LIFTING FORCEPS

IN pulling up the neck of the gall-bladder, even after aspiration of the fluid contents, the inflamed and thickened wall of a distended gall-bladder may tear through if it is grasped by cholecystectomy or artery forceps, while tissue forceps or triangular forceps are apt to crush the contents or pull off. In the special forceps shown in the accompanying Figures the blades are sufficiently bowed to leave

FIG. 1.—Gall-bladder lifting forceps.

room for the gall-bladder even when its neck contains stones. The finely serrated jaws, half an inch wide, give a firm grasp, which enables the surgeon to pull up the neck of the gall-bladder without danger of tearing the structures and gives a good exposure for

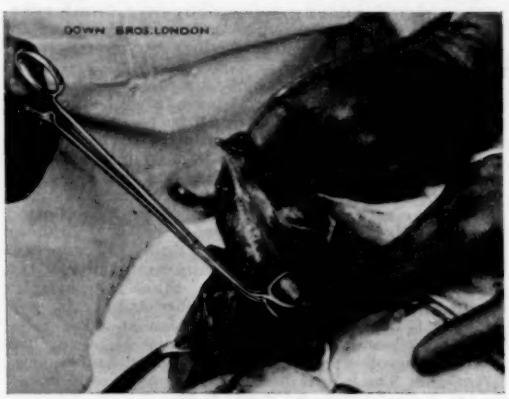


FIG. 2.—The forceps in use in a gall-bladder operation.

the dissection of the cystic duct and artery before cholecystectomy.

The forceps were made for me by Messrs. Down Bros. of St. Thomas's-street, S.E.1.

T. B. MOUAT, M.Ch. Edin., F.R.C.S.

Sheffield.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF ORTHOPÆDICS

AT a meeting of this section held on Nov. 1st, Mr. R. OLLERENSHAW delivered his presidential address on

Certain Changes in the Femoral Neck in Childhood

He said that all through life the femoral neck was vulnerable, but particularly in infancy and childhood. The conditions in which it might be affected included rickets, tubercle, Perthes's disease, fibrocystic disease, cleido-cranial dysostosis, and congenital dislocation. He proposed to discuss only two conditions, infantile coxa vara and slipped epiphysis.

He had had under treatment 16 cases of *infantile coxa vara*, 10 of which were bilateral, 9 occurring in boys and 7 in girls of ages from two to eleven. The symptoms were a rolling gait, lordosis, particularly well marked in the bilateral cases, raising of the trochanter, loss of abduction, and a complete absence of pain. The condition occurred in people of small stature. The radiogram showed an alteration in the angle of the neck and a shortened neck. A clear area was evident in the neck at its junction with the head distinct from the epiphyseal line and distal to it, and often it was possible to demonstrate a fragment of bone on the lower surface of the neck, shaped like an inverted V. A developmental origin had been suggested. Certainly there was no hereditary factor. There seemed to be no connexion with trauma, and the occurrence of bilateral cases was against a traumatic ætiology. In none of his cases had the president found evidence of rickets or of renal rickets; no patients had had albuminuria. The change appeared to be of the nature of an aseptic necrosis. Regeneration of bone would not take place as long as weight-bearing was allowed *across* the long axis of the neck; solidification began as soon as the weight was transmitted in the long axis. Only children of the hospital class were affected. The president expressed his conviction that infantile coxa vara was an entity distinct from cranio-cleido dysostosis. He showed radiograms to illustrate the differences in the appearances of the femoral neck in the two conditions. He had not himself had the opportunity of examining the very early stage of infantile coxa vara, but it was said to start as small areas of rarefaction which coalesced. Certainly the process, once developed, progressed rapidly, and, if not treated surgically, it went from bad to worse. The treatment was a wedge-osteotomy planned to bring the femoral neck and shaft into alignment. Very wide abduction was necessary; radiograms showed that after this operation the neck developed into a solid bony structure. Relapse occasionally occurred, and in such cases a second wedge-osteotomy must be done. Apart from operation the outlook was very bad. The president showed on the screen a film of six patients he had treated by osteotomy. The functional result was excellent, at times even better than the shape of the neck in the radiogram would lead one to expect.

Slipping of the upper femoral epiphysis.—These observations were based on 22 personal cases affecting 12 boys and 10 girls between thirteen and sixteen years old. The first point emphasised was that the condition was a disease and not the result of trauma. There was usually a history of mild trauma but its significance in the ætiology was secondary. The president had carried out experiments on femora removed from corpses with a view to determining the amount of force necessary to injure the region of the epiphyseal line and the nature of the resulting lesion. A force of 45 lb. had been necessary, whether exerted directly or as torsion, to produce disruption, and then the neck fractured *outside* the epiphyseal line. It had been pointed out (Perkins 1932) that in epiphyseal displacements at the upper end of the femur the typical diaphyseal fragment was never found. In many cases, on careful inquiry, a history could be elicited of limping or pain considerably antedating the injury. In none of these cases had there been violence of any note. All but 2 were heavy children, and 11 of the 22 were not only heavy but showed a definite Fröhlich's syndrome. The president believed that the endocrine factor was an essential one, and that the epiphyseal line was diseased. He also thought that the epiphysis joined earlier than was generally supposed. Anatomical text-books gave the age as 18; he thought 14 to 16 was nearer the mark. Repair in slipped epiphysis was always by bone and there was no case reported of the epiphysis giving way a second time. He had not found evidence of rickets or of renal rickets in any of his cases.

It was important that the non-traumatic origin of this disease should be widely recognised, for it had come to his knowledge that two girls in domestic service had recently been awarded damages for slipped epiphyses occurring after slight trauma. If the condition could be recognised in the pre-slipping stage, the correct treatment was fixation in plaster for three months followed by six months in a walking calliper. Early stages of slipped epiphysis should be reduced under anæsthesia and treated in plaster, with a further period of six months in a walking calliper splint. There seemed no objection to the use of a Smith-Petersen nail for fixation, as the growth taking place at the epiphysis after the injury was inconsiderable, and good results had been reported from this procedure. In the later cases reduction was impossible, and they should be treated by sub-trochanteric osteotomy; but conservative measures were also very satisfactory even if after-treatment was less simple. Really good results were mostly obtainable. Osteotomy gave satisfactory function, even in bad cases. When the patient was seen at an early stage and reduction was possible no shortening should occur. Films were shown to illustrate the recovery of function and the type of patient affected by the disease.

Mr. H. A. T. FAIRBANK observed that the president had been lucky in the number of epiphyses he had been able to reduce, for in his own experience they united firmly almost as soon as they slipped. He was quite sure he had seen infantile coxa vara associated with cranio-cleidodysostosis.

Clinical Cases

Mr. ST. J. D. BUXTON showed *multiple deformities in two sisters*. The father of the children was said to be a dwarf; the mother was normal. The facial deformities included a sunken nose, high palate, and knotched teeth, suggesting achondroplasia rather than congenital syphilis. The Wassermann reaction of one child was positive, of the other negative. The limbs were deformed and all four elbows were dislocated. The younger child, aged 9, had bilateral uncorrected talipes equino-varus; the elder, aged 10, had dislocation of both hips and anterior dislocation of both knees and a peculiar method of progression. Both children were active and intelligent.

Mr. W. HARVEY GERVIS showed *malunion of tibia and fibula* in a child aged 2½, and asked for advice on further treatment. The bones were fractured at the age of 3 months and remained untreated for 6 months. The child had been seen when a few months old, and the leg had been put in plaster. It united with forward angulation, and was refractured and reset and replastered. The child moved to Scotland, where the fracture was found ununited and plaster was again applied. Forward angulation occurred again and that was the present condition. Suggestions made for treatment included: (1) Drilling holes through the shaft above and below the site of fracture in the tibia, and after allowing time for development of bone activity, breaking and resetting the bone. (2) Breaking the bone at a higher level.

Mr. A. T. FRIPP presented as a case of *Albers-Schönberg disease* a girl aged 13. A year ago she broke her femur at the junction of the upper and middle thirds. The fracture united well, but in September, 1938, she complained of aching in both knees. Both femora and the upper ends of both tibiæ were found to be thickened, with restriction of flexion in the knee-joints. Radiograms showed widespread changes in the bones typical of Albers-Schönberg disease. There was no anæmia. The serum calcium was 10·8 mg. per c.cm., and the plasma inorganic phosphorus was 1·81 mg. per 100 c.cm. Mr. Fairbank commented on the absence of anæmia and of optic neuritis, the two symptoms that, with thickening of the bone, constituted the syndrome of the disease. It was not certain whether the bony change was one of hypercalcification or of sclerosis. He thought it possible, though unproven, that the degree of anæmia was affected by the fibrosis of the marrow. Mr. Ollerenshaw drew attention to the deafness of the patient and to the bosses on the forehead.

Mr. J. C. NICOLSON showed *syphilitic osteitis with ? bilateral Charcot's disease of the hip-joints* in a patient with gonorrhœa who denied having had syphilis. The Wassermann reaction was negative. The patient had had no symptoms until 3½ years ago. The heads of the femora were much enlarged and there was a considerable degree of bilateral coxa vara. The radiogram showed marked thickening of the cortex of the long bones with hypertrophy at the hip-joints and loose bodies, and there were signs of tabes. There was general agreement with the provisional diagnosis.

Mr. G. O. TIPPETT presented a case of *kyphosis* for diagnosis. Radiograms showed "wedging and hollowing out of the anterior part of the bodies of the dorsal vertebræ, with diminution of the joint spaces between adjacent bodies with cavitation on the undersurfaces of some." The patient, a woman aged 28, had had a rigid kyphosis for years and had pain in the lumbar spine. Mr. Tippett thought the changes were congenital and suggested a Scheuermann's type of spinal defect. The consensus of opinion was that the condition was tuberculous in origin. Mr. H. Seddon said he could see the outline of an abscess in the radiogram.

Mr. J. A. CHOLMELEY presented a case of *anterior poliomyelitis* for opinion on further treatment. The patient, a boy aged 9, was admitted to hospital in November, 1936, suffering from acute anterior poliomyelitis. In July, 1937, he was walking badly with a waddling gait, and he was treated in a plaster bed with massage and exercises until March, 1938. The abdominal muscles, erector spinæ, and the abductors of the hips were all weak. Mr. Cholmeley pointed out that the gait was the most worrying part of this condition, but elicited no suggestions for means to improve it.

HUNTERIAN SOCIETY

AT a meeting of this society held on Nov. 7th the chair was taken by Mr. ANDREW C. MCALLISTER, the president, and Dr. H. YELLOWLEES opened a discussion on the thesis that

The Psychological Treatment of the Criminal is Preferable to Punishment of the Crime

The title of the debate was, he said, that most irritating thing: a false alternative. It was like saying that trust in God was preferable to keeping your powder dry. Of course it was in one sense true, but the two were not in the same category and were not likely to come into intimate or harmonious coöperation for many a year to come. The tendency of society to protect itself from those who broke its laws went back so far that it was almost an instinct. If society avoided that duty it would soon cease to be an organised society at all. However stumbling progress in dealing with lawbreakers might have been, our penal system was becoming less vindictive, more reformative, and more humane. In not one case in ten thousand did the punishment fail to be accompanied by equity and adorned by mercy. Society was beginning to recognise its duty to the criminal. The highest expression of that duty lay in regarding him as a mentally sick man. On no subject was it so easy to indulge in muddled thinking. It was absolutely true that many an antisocial act was committed under the pressure of an irresistible psychological force all the more terrible in that it was not consciously realised. Medicine had been slow to realise and to preach that society's duty to the criminal might best be expressed in making him realise that truth which would make him free. It weakened these facts to ignore the many and serious fallacies with which they were encompassed. They could not be applied to the whole criminal picture indiscriminately. Psychotherapy could not be applied to the mind of the criminal class as a hot bath was applied to bodies; it was always a failure in the absence of the sincere, willing, and persistent coöperation of the patient. Its message was not "I can cure you, by my magic, of your idleness, envy, hatred, malice and all uncharitableness." To some it had to say "I cannot help you." To most it said "If with all your heart you earnestly seek it, I can help you to a better understanding and therefore to a fuller control of those conditions which underlie your antisocial conduct." It could not fairly be said that in the criminal population there was a large number who sincerely and consistently wanted to be different. Of course there were some; who was to decide which could respond to psychotherapy's appeal? Obviously this was the duty of the law. Law from Harley-street was a thing that the British public never had tolerated, never would tolerate, and ought not to tolerate. Yet it was hard to imagine anything less qualified to make that decision than the law. Its criteria of criminal responsibility in cases of glaring insanity showed how utterly unable it was. Curative psychological treatment was an ideal; an enlightened and progressive penal system was a present necessity. One day the ideal might become as nearly realised that the necessity might pass away. It was just conceivable that in the very end society's duty to the criminal and its duty to protect itself would prove to be one and the same thing, both included in the old law: Thou shalt love thy neighbour as thyself.

Mr. ST. JOHN HUTCHINSON, K.C., said that the subject was a difficult one because the words psychoanalyst and psychotherapy had become the subject of jokes among so many unthinking people. As a matter of fact it was one of the most serious subjects that could engage the minds of doctors and lawyers. No help would be given by being sentimental. The paths of doctors, scientists, and lawyers were going along together. There came to the dock time after time people who ought to be in hospital. The decisions as to insanity made to-day were based on a judgment 70 years old and any attempt to get away from it was frowned upon by learned judges. There was no occasion, however, to go to the other extreme and say that all criminals were sick. In sex offences the English law was very blind and very cruel because the ordinary man reacted against unpleasant sex matters. In these offences above all others the law ought to invite help from medical experts. The other great work to be done was in counteracting the increase in juvenile crime. It was often due to environment and often to some little kink which could be completely corrected; binding over was not enough. The recidivist was another problem. These three sets of people could be helped through the probation officers and magistrates and by introducing more psychological understanding into prisons. It was necessary to punish crime, but equally or more necessary to save the criminal.

Sir HOLMAN GREGORY, K.C., agreed that there was no doubt that it would be better for many prisoners to be treated psychologically, but to say that every criminal should be so treated was absolute nonsense. There were two forms of offence: against the laws of nature and against the laws of society. Punishment for the former was instinctive. Punishment was not retaliation; its object was the prevention of future crimes by the original offender and by others. Often enough a prisoner could for his own sake be let out on his own recognisances and would never fall again, but imprisonment was essential as a deterrent to others. There were also incorrigible persons who had made up their minds to prey on society; they must be kept in prison for the protection of citizens. By far the greater number of people who came before the courts could be treated psychologically, but that was not to say that they ought to be sent to hospital and not to prison. The fear of prison was a much more valuable deterrent than the actual knowledge of prison. No one had done more to help prisoners than he had and he would do anything to prevent the unfair treatment of men who had been sent to prison. The Government ought to deal with the discharged prisoners.

Mr. ALBERT LIECK said that the resolution was already dead. Dr. Yellowlees had killed it and Mr. St. John Hutchinson had tactfully avoided the corpse. He compared it with the proposition "that dietetic treatment was preferable to surgical interference." Psychology had been described as a science in its infancy, but it was really in a pre-natal stage with little prospect of coming to live birth. Psychologists had created a terminology and called it a science. But there was a practical psychology which we all practised as we all talked prose. The confidence trickster was an expert psychologist. The criminal wanted his psychological treatment before he became a criminal at all. He did not suddenly become extremely evil. There was the same type of confusion in the minds of those who talked about "the criminal" as those who talked about "the Aryan." A great deal of punishment was educative punishment, just to teach people they were doing wrong. Were doctors who infringed the law of abortion or broke the speed limit to be treated psychologically? The vast majority of criminals were perfectly normal. Punishment was a kind of psychological treatment and psychological treatment a cruel form of punishment. Prison was only dull but psychological treatment could be extremely boring. Probation was the most helpful and hopeful form of treatment ever invented. It was quite impracticable to give psychological treatment to 75,000 persons a year. Punishment was a makeshift, as surgery was, but this was a makeshift world. All science was only a matter of trial and error. The great thing was to select the makeshift most apt for the matter in hand and to treat no one makeshift as a universal panacea.

Dr. WILLIAM IBBETSON thought we had reached a halfway house between idealism and materialism, a stage which engendered restlessness and uncertainty. A sane mental readjustment would provide a more lasting remedy than punishment. To-day man began to think for himself and to discard his authorities. He got into a quagmire of doubt and distrust because his education was too slender to support him. Punishment wisely administered induced fear and respect, and respect was an early stage of faith. To cure an evil, its cause must be known.

Mr. RENTON thought that the motion was useful even if it only went so far as to show that some measure of reform was needed. Patently, there were many cases where psychological treatment was unnecessary. Criminals, like poison gases, could be classified as persistent and non-persistent, and might further be divided according to motive. Where motive was sheer necessity there was no psychological element. Bravado and lack of discipline accounted for some crimes; there were criminals who sought only thrill, and many of these were virile, skilful, and mentally well equipped. Avarice produced high-class criminals —international crooks and cardsharpers—often physically and mentally above normal. Again, there were the certifiably insane, and also those who were impelled to commit crimes because of a kink. For these something should be done, and psychological treatment involved no danger to society, since it would mean segregation. Lawyers looked to doctors for guidance and sought a clear lead as to the precise state of scientific advancement in this matter. They did not know what psychologists were talking about, and begged them to clarify the position.

Mr. LEOPOLD SPERO thought that criminals could not logically or factually be grouped as one class. Criminals varied. There was the man who did make crime pay. There were those who fell through weakness. There were well-to-do kleptomaniacs, and such people might be bound over on condition of psychological investigation. There were people whose attitude to crime was distorted by the personal view they took of it. There should be some means whereby the criminal after hearing might be brought up for consideration of the best measures to take; and here doctor and lawyer might get together.

REPLY

Mr. ST. JOHN HUTCHINSON pointed out that people usually dealt with anything new by first of all laughing at it and then bringing out their trump card, the practical difficulty. Of course there were difficulties, but these were there to be encountered and overcome.

Dr. YELLOWLEES said that a first essential for an understanding or definition of psychology was a

complete sincerity. It had as one of its great aims the delivery of little ones from fear and the giving to them of a sound mind.

The motion was carried by a large majority.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY

AT a meeting of this society held in Manchester on Oct. 14th, Mr. T. F. TODD read a paper on

Rectal Ulceration Following Irradiation

of carcinoma of the cervix. He said that often these reactions were not recognised; several patients who had previously had radium treatment elsewhere had been referred to the Christie Hospital for further irradiation of the reaction misdiagnosed as a rectal carcinoma. Reactions were seldom reported and there were hardly any published observations on the pathology of the condition. Rectal reactions might be early, appearing as acute proctitis, or late, in the form of chronic ulcers resembling rectal cancers. Mr. Todd had personal experience of 34 chronic rectal reactions in approximately 800 treated cases. Morphologically chronic rectal reactions assumed one of two types. The first was a lesion restricted to the anterior rectal wall, usually at the level of the cervix uteri, and forming a mobile ulcerated mass some 3 to 5 cm. in diameter, resembling an operable carcinoma. The second consisted of a rectal ulcer similarly situated, but associated with gross peri-rectal induration and the formation of a hard fixed mass enveloping the rectum, anchoring it to the sacrum, which might be mistaken for advanced inoperable cancer with extensive extra-rectal spread. The onset was usually 6 to 9 months after treatment. The symptoms were tenesmus, melæna, and often severe pain. The prognosis varied with severity of the reaction and its type. Spontaneous healing was the rule, but stenosis might occur and require colostomy.

As to ætiology the reaction might be caused by accidental local over-dosage, due to slipping of the radium applicators and their approximation to the rectum in the posterior fornix, or by retroversion, which allowed the intra-uterine applicator to project against the rectum. Mr. Todd believed the main ætiological factor to be obliteration of blood-vessels in the posterior segment of the pelvis as the result of general high dosage. In the only recorded case coming to autopsy the rectal ulceration was shown to be due to mucosal necrosis. A peri-rectal mass was present composed of avascular fibrous tissue showing on histological examination widespread vascular occlusion and pronounced endarteritic changes. Mr. Todd described the treatment of chronic reactions and their complications. Presacral neurectomy had been done in 4 cases in order to relieve pain and accelerate healing. The incidence of rectal reactions could be minimised by precautions to avoid misplacement of vaginal applicators and over-dosage, and by nursing patients in the prone position. Presacral sympathectomy might act as a prophylactic against massive peri-rectal fibrosis by causing vasodilatation.

Cases and Specimens

Prof. DANIEL DOUGAL described a case of *adrenal virilism*. The patient, aged 49, had been referred to him by a radiologist who had been treating her for facial hirsuties. The undue growth of hair had first appeared 2 months after the cessation of the menses. The patient's general condition was poor. The liver was enlarged. A laparotomy disclosed the presence of an adrenal tumour with multiple visceral metastases, and death occurred 48 hours later. The primary tumour proved to be a highly malignant tumour of the right suprarenal gland. The lungs were filled with secondary deposits which had not given rise to symptoms. Prof. Dougal discussed the general causes of sex deviation and in particular the rôle of the secondary endocrinal mechanism in determining the sex characteristics.

Prof. MILES H. PHILLIPS described a case of *acute prolapse of the urethra* in a doctor's wife aged 70 or more, who had for many years refused all treatment for procidentia other than a pessary. At no time had she had any urinary symptoms. The prolapse occurred suddenly; she noticed blood in her clothes after micturition and examination disclosed an elongated insensitive swelling about 1 inch long protruding from the vestibule. It was easily dealt with by excision and suture. This was the fourth case of acute prolapse Prof. Phillips had seen, and the thirteenth reported to the society. The fact that no such case had been recorded in the *Transactions* of the London Obstetrical Society or the *Proceedings* of the Royal Society of Medicine between 1859 and 1938 was doubtless due to the fact that the condition had not been thought worthy of record. Urethral prolapse seemed to occur either in young children or old women and could always be cured by excision. The late Prof. Leith Murray had recorded four cases successfully treated by digital replacement after the application of adrenaline.

Dr. MARY EVANS (Manchester) described *spontaneous rupture of the uterus* in a patient who had been delivered of her first child by craniotomy. In her second pregnancy she came into labour prematurely at the 8th month, and after a labour of 6 hours was delivered normally of a living male child. The placenta was retained and two hours after delivery she collapsed suddenly with severe pain in the shoulder. Laparotomy disclosed a hæmoperitoneum and a small rupture of the fundus. A total hysterectomy was performed and an irregularly shaped placenta was found still in situ with a rupture of the uterine wall in the placental site.

Dr. J. W. BRIDE discussed a case of *adenocarcinoma of the body of the uterus*. The patient had had 110 mg. of radium inserted for 22 hours more than four years ago on account of post-menopausal bleeding, for which no cause could be found. The uterus was very much more enlarged than is usual in carcinoma corporis, and the cavity was much distended. Dr. Bride thought it unlikely that the growth had been present for 4 years, and suggested that the malignant change might be due to the irritation of the secretions retained in the uterus as a result of stenosis of the cervix following the radium treatment.

REPORT CARD FOR CASES OF SUSPECTED DRUNKENNESS.—Messrs. Sweet and Maxwell Ltd., of Chancery-lane, W.C.2, have designed a card for doctors to record their findings in the examination of persons suspected of being under the influence of drink. The card is 8 in. by 6 in. and on one side provides space for general particulars, history, the results of physical examination, observations on coördination and mental state, and the doctor's opinion. Particulars of subsequent examinations, dates of hearing, and verdict are to be recorded on the back. The space for notes is so limited that few doctors could complete the form without having their own coördination severely tested. The various detailed headings will, however, serve as a valuable reminder of essentials.

REVIEWS AND NOTICES OF BOOKS

Population: To-day's Question

By G. F. McCLEARY. London: George Allen and Unwin. 1938. Pp. 222. 6s.

Dr. McCleary has been notably successful in his aim to provide a simple and impartial account of the most important aspects of the population problem without using statistics or technical terms. The attitude of the thinking public towards population problems has undergone certain recognisable phases in this country. Under the influence of the mercantilists, high fertility was encouraged. But with the advent of the physiocrats—men such as Quesnay and Turgot, who were precursors of Malthus—a reaction set in which lasted for over a century. The bitter controversies which had continued to range round the doctrines of Malthus—the violent denunciations and equally passionate vindications—are here discussed in a bland spirit. Dr. McCleary poses the question "Did Malthus establish his main thesis that at any given time man's power to produce children is greater than his power to produce the means to enable him to live and rear his children, and that the superior power is constantly being checked by vice, misery and moral restraint?" The conclusion reached is that he did not. Yet Dr. McCleary writes of the "Essay on the Principle of Population" that it is one of the very few books whose appearance may be regarded as an historical event. The essay initiated the period of decline in fertility in England and Wales—a period which saw the development of the movement called, with doubtful appropriateness, "Neo-Malthusian." The reaction from this period in England has only just set in; to be precise, it was initiated, so far as the public was concerned, some two years ago, by a recognition of the delayed effects of a declining birth-rate. These effects, Dr. McCleary points out, reveal themselves in three stages: first the birth-rate goes down; later the annual number of births goes down; and finally the population goes down—at first slowly and then with increasing rapidity.

Dr. McCleary examines this declining fertility—by what methods it is best measured, what are its causes, and what will be its repercussions. Each of the chapters develops an argument which, with a happy blend of erudition, judgment, and logic, is guided to a significant conclusion. Especially valuable is a chapter devoted to the problems of quality versus quantity, which is in effect a balanced discussion of the essential postulates of eugenics. An excellent book which deserves to be widely read.

Principles and Practice of Medicine

Thirteenth edition. By the late Sir WILLIAM OSLER; revised by HENRY A. CHRISTIAN, M.D., LL.D., S.D., F.R.C.P., Hersey Professor of the Theory and Practice of Physic, Harvard University; Physician in Chief, Peter Bent Brigham Hospital, Boston. London: D. Appleton-Century Co. 1938. Pp. 1424. 35s.

Osler's famous text-book has now passed from the hands of Thomas McCrae to those of Henry Christian, who says that "in preparing this revision, wisely or unwisely, I have had the assistance or criticism of no one." The new type of the twelfth edition, which though small was very distinct, has been replaced by larger type; the page is also larger, and the book therefore more bulky, without being any easier to read. Dr. Christian has rearranged, revised, or rewritten a large proportion of the text, incorporating the major advances of the last three years, and infiltrating the book with his personal views and teaching. Its traditional foundation has always been a broad clinical experience informed by a constant study of morbid anatomy, and this tradition clearly remains in safe hands.

Management of the Sick Infant and Child

Fifth edition. By LANGLEY PORTER, B.S., M.D., M.R.C.S. Eng., L.R.C.P. Lond., Dean, University of California Medical School, and Professor of Medicine; and WILLIAM E. CARTER, M.D., Director, University of California Hospital Out-patient Department. London: Henry Kimpton. 1938. Pp. 874. 42s.

THE fifth edition of this book, which is more ambitious in scope than its title suggests, differs but little from its predecessors. Some pædiatric procedures applicable more particularly to older children have been included, and a number of minor errors and omissions have been corrected. Though the main emphasis remains on treatment, the authors seem to have aimed, not too successfully, at making the volume into a short system of children's diseases. The writing in places is loose and inaccurate. Vigorous pruning would make the book more readable and would increase its practical value.

Statistical Tables for Biological, Agricultural and Medical Research

By R. A. FISHER, Sc.D., F.R.S., and F. YATES, M.A. London: Oliver and Boyd. 1938. Pp. 90. 12s. 6d.

WE have observed with satisfaction the increasing reliance on statistical methods in the planning and interpretation of medical research. Prof. Fisher and Mr. Yates have here supplied a notable addition to the number of tables available for this and other purposes. The first eight tables in their book make it possible to perform all the usual tests of significance for small or large samples rapidly and with little labour. Of special interest are three tables which facilitate the calculations necessary in interpreting a biological assay when the response observed is of the quantal or all-or-none type. For example, if a fixed dose of a test toxin together with increasing doses of an antitoxin are given to groups of animals, and the percentage of animals protected in each group is plotted against the dose, a sigmoid curve usually results. By an appropriate transformation of the percentages, which is easy to make with the help of these tables, the curve may be replaced by a straight line and the assay interpreted with much less difficulty.

In designing a biological experiment two essential principles are randomisation and replication: the groups to undergo the various treatments should be selected at random, and the same treatment should be repeated a number of times. The authors have given much attention to the elaboration of effective experimental designs and tables are devoted to two modern types of design, known as Latin squares and balanced incomplete blocks. Designs of this sort were first employed in agriculture but are now being found appropriate to many other subjects, for instance nutrition experiments, and are likely to be used

more and more in medical work. A new table of random numbers is also provided. Of value to psychologists is a table for scoring ranked data; it gives the correct score to be assigned to the 1st, 2nd, 3rd, and other members of a list arranged in descending order when the underlying character is assumed to have a normal frequency distribution.

Other tables give logarithms, squares, square roots, factorials, and trigonometrical functions. Mathematical, physical, and chemical constants and weights and measures are set out and workers seeking such diverse quantities as the charge on an electron, the composition of certain fertilisers, and the supposed duration of geological periods of time will find them. In fact an astonishing amount of useful miscellaneous information has been collected and presented in the form most convenient for easy reference.

Cause and Prevention of Disease

By WILLIAM HARVEY PERKINS, M.D., Professor and Director of the Hutchinson Memorial Clinic, Tulane University of Louisiana, New Orleans. London: Henry Kimpton. 1938. Pp. 713. 35*s*.

THIS is a treatise on preventive medicine written on somewhat novel lines. It deals with the ætiology of disease taking as its text: "To oppose or intercept a cause is to prevent or dissipate its effects." The author admits his indebtedness to the Categorical List of Causes of Disease and Ill Health of G. L. Fisk and the setting of the book is largely in Fisk's framework. The book gathers up many of the loose threads of hygiene and students of public health, including those working for their diploma, will find in it much useful information not readily available. In particular the study of poisoning and other industrial hazards is much more complete than is usual in hygiene text-books. The public health aspects of psychology and sex are also given exceptionally full treatment. Teachers too will find the book suggestive. If it does not replace the usual text-books it forms a valuable supplement to them.

Dr. Bradley Remembers

By FRANCIS BRETT YOUNG. London: William Heinemann. 1938. Pp. 745. 8*s*. 6*d*.

Mr. Brett Young has written the story of an honest angular creature, of no great intellectual pretensions who, after serving a useful apprenticeship to an old bone-setter, enters a provincial medical school, qualifies without distinction, and becomes a general practitioner in a small Black Country town. He marries happily but loses his wife as a result of puerperal septicæmia. His only son, spoilt by his mother and pressed, against his inclination, to take up medicine by a father anxious to turn the boy into an improved edition of himself, comes to a bad end. Dr. Bradley loses all his savings through a colliery disaster but, taught by bitter experience not to expect too much from life, seeks and finds solace in his work till finally he retires on a pittance at the age of 75.

Such is the brief outline of a long novel which, thanks to the author's skill, never becomes tedious. The subsidiary characters are well drawn, notably those of Dr. Jacob Medhurst, a shrewd, money-grubbing Victorian, and of Martin Lacey, a zealous and incorruptible surgeon who is Bradley's lifelong friend. Mr. Brett Young has not forgotten what it is to be a doctor and writes with a sure touch. His sympathy with general practitioners has perhaps led him to stress unduly the seamy side of their lives, their professional rivalries, and their economic struggles, with the result that Bradley emerges as a pathetic rather than a heroic figure. But the drama of a doctor's life is not overdone and the medical detail is accurate enough not to irritate those familiar with it.

Quarterly Journal of Medicine

THE October issue contains the following papers:—

ANÆMIA IN MYXŒDEMA: AND THE RÔLE OF THE THYROID GLAND IN ERYTHROPOIESIS. By Richard Bomford (The London Hospital). Ten cases of myxœdema with anæmia are described. In five the anæmia is hypochromic and of the common iron-deficiency type; iron repairs it. In one there is typical Addisonian anæmia, responding to liver treatment. In four there is a moderate anæmia with macrocytosis but with no poikilocytosis and no excessive anisocytosis; free acid may be present or absent in the gastric juice; excess carotin in the plasma may colour the skin yellow. This kind of anæmia is held to be the uncomplicated anæmia of myxœdema. Iron and liver do not influence it but it disappears slowly under prolonged thyroid treatment. There is no good evidence, however, that it is brought about directly by a lack of thyroxine in the bone-marrow, or that thyroxine is a factor, analogous to liver factor, iron, and vitamin C, essential to the normal process of erythropoiesis. Alternatively, the author follows Wälchli in regarding this anæmia as part of a physiological reduction in size of the erythron in response to the diminution in the demand for oxygen on the part of the myxœdematous tissues with their lowered metabolic rate.

STAPHYLOCOCCAL INFECTIONS AT SINGAPORE. By William Hughes (General Hospital, Singapore). Various clinical forms are exemplified, such as boils alone, staphylococcal fever with boils, boils followed by metastatic abscesses in internal organs, boils followed by metastatic non-purulent inflammatory lesions in muscles and connective tissues, lung abscess following boils or apparently arising spontaneously, abscesses in muscles with or without antecedent boils, and pemphigus contagiosus. Immunological aspects of these infections are discussed, with the conclusion that toxoid and antitoxin treatment lacks both rational and empirical justification.

THE HÆMOPOIETIC ACTIVITY OF THE HUMAN STOMACH IN PERNICIOUS ANÆMIA. By John Frederick Wilkinson, Louis Klein, and Charles Amos Ashford (Royal Infirmary, Manchester). Incubation of normal human stomach (post-mortem material) with beef-muscle yields an anti-pernicious anæmia principle apparently similar to that extracted from liver. When stomach from a case of pernicious anæmia dying in relapse, or stomach from a treated case of pernicious anæmia in remission dying from pneumonia, is incubated with beef-muscle no anti-anæmic activity is developed.

AN INVESTIGATION INTO THE TREATMENT OF PARKINSONISM WITH BULGARIAN BELLADONNA. By N. S. Alcock and E. Arnold Carmichael (National Hospital, Queen-square, London). Comparative tests on five patients, using ergographic records of rapid voluntary flexion and extension of the elbow, show that Bulgarian belladonna has approximately the same beneficial effect as English belladonna or as stramonium.

OBSERVATIONS ON THE RELATION OF LEUCOCYTOSIS TO ASCORBIC ACID REQUIREMENTS. By Tracy D. Cuttle (St. Bartholomew's Hospital). Two cases of acute leukæmia and two of chronic leukæmia, while showing no clinical improvement on large doses of ascorbic acid, yet retain an excessive amount of the vitamin, as compared with controls. The extra retention bears a direct relation to the number of circulating leucocytes, and the amount of ascorbic acid in the blood-cells (whole blood minus plasma) is correspondingly increased. This supports the suggestion that the increased vitamin-C requirement in infection is due in part to leucocytosis and uptake of vitamin C by leucocytes.

THE LANCET

LONDON: SATURDAY, NOVEMBER 12, 1938

CEREBRAL BIRTH TRAUMA

IF asked what is the most important form of cerebral birth trauma most practitioners, and probably most obstetricians, would reply "intracranial hæmorrhage." Yet from a practical standpoint—looking at the remote effects of abnormal birth—this is possibly the wrong answer. CRAIG's instructive study[1] of 126 cases of intracranial hæmorrhage in the new-born brings out not only the many difficulties in diagnosis but also the severity of the effects of bleeding within the skull. Recovery is possible, and he makes a strong plea for "skilled nursing comparable with that ordinarily available to an adult case of pneumonia or typhoid"; but in general the type of lesion that he describes and illustrates seems incompatible with prolongation of life. While supporting his appeal for the better care of such infants, we believe that an even more urgent need is the proper management of another type of birth trauma, summed up in the word "anoxæmia." This is more serious because it is less understood.

In a striking paper[2] SCHREIBER of Detroit, a neurological surgeon, takes the view that asphyxia occulta, as he calls it, is the greatest menace to-day as regards permanent injury to the brain of a new-born baby. Analysing a series of 500 patients seen because of cerebral symptoms persisting or arising after the neonatal period, he has discovered that about 70 per cent. of those whose birth record is available had a history of respiratory difficulty. Seeking for the cause of their failure to breathe properly SCHREIBER finds it in depression of the fœtal respiratory centre by drugs given to relieve or abolish pain during labour. The severity of cerebral symptoms is, he says, in direct relation to the length of the apnœa, and the amount of damage to the brain is in direct relation to the severity of the symptoms. He expounds this thesis of the danger of maternal analgesics in some detail, and quotes the observation of IRVING, BERMAN, and NELSON[3] that when no drugs or anæsthesia were given to the mother only about 2 per cent. of babies failed to breathe; whereas when barbiturates were used the incidence grew rapidly higher, and with Pantopon (papaveretum B.P.C.) and scopolamine (hyoscine) the alarming figure of 67 per cent. was reached. "One of the toxic effects of all drugs used to produce analgesia in labor is depression of the respiratory center" writes SCHREIBER, and he points out that drugs are employed in obstetric practice in doses often much larger than those advised by pharmacologists. For example, a standard pharmacological work states "with ordinary individuals it is not safe to exceed 1/120 grain" of hyoscine, repeating this dose every six to eight hours if necessary; whereas an authoritative obstetric view of the correct dosage is "1/100 grain every half hour for 3 doses and then 1/100 grain every two hours," the average quantity given in a large series of labours being 5/100 grain. By an ingenious diagram he illustrates the phases through which the fœtal respiration centre passes as the lack of oxygen rises from "normal intra-uterine anoxæmia" and "normal birth trauma" to the more dangerous degrees attributable to abnormal conditions, intervention, oxytocics, analgesics, and anæsthetics. The "vital line" ends with asphyxia, continued apnœa, and neonatal death; or (almost worse) with "fixed brain lesions" producing the spastic child, the convulsive child, and the mentally retarded child.

SCHREIBER's allegations occasion furious thought at this time of increased employment of pain-relieving drugs during labour. If he is right, the risk of respiratory difficulty, and hence of a brain-wrecking lack of oxygen, is by their use multiplied twenty or thirty times. This—and not intracranial hæmorrhage—appears to be the most serious form of cerebral birth trauma, and it arises not from uncontrollable factors but from the administration of drugs in excess of the pharmacological dosage. Here we are faced with another aspect of the problem of "babies who do not breathe," which was discussed in these columns on Sept. 24th.

[1] Craig, W. S., *Arch. Dis. Childh.* 1938, **13**, 89.
[2] Schreiber, F., *J. Amer. med. Ass.* Oct. 1st, 1938, p. 1263.
[3] Irving, F. C., Berman, S., and Nelson, H. B., *Surg. Gynec. Obstet.* 1934, **58**, 1.

STEPS TOWARDS INFLUENZA PROPHYLAXIS

IN 1933 it was shown that epidemic influenza is caused by a virus. The work of the next three years brought no suggestion that this virus was of more than one antigenic type: strains were isolated in various parts of the world, and cross-immunity tests in ferrets revealed no significant difference in their make-up. In 1936, however, MAGILL and FRANCIS,[1] using neutralisation tests with sera made in the rabbit, found that two strains, which they had previously considered identical, had definite antigenic differences. Confirmation was soon forthcoming; BURNET[2] in Australia, and STUART-HARRIS, ANDREWES, and SMITH[3] in this country, demonstrated antigenic differences that sometimes went so far as to indicate the existence of separate antigenic types. The bearing of these observations on immunisation against influenza was obvious, and further developments have been anxiously awaited. How many antigenic varieties would be brought to light, and how deep would the differences go? Would it be possible to find what ANDREWES has termed a "master" strain, which had all the dominant antigens of the group and could be generally used for prophylactic

[1] Magill, T. P., and Francis, T., jun., *Proc. Soc. exp. Biol., N.Y.* 1936, **35**, 463.
[2] Burnet, F. M., *Aust. J. exp. Biol. med. Sci.* 1937, **15**, 369.
[3] Stuart-Harris, C. H., Andrewes, C. H., and Smith, W., *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 228, 1938.

immunisation? Or might we have to fall back on a polyvalent vaccine?

The October number of the *British Journal of Experimental Pathology* contains three papers that go some way towards answering these questions. The first two, which are by FRANCIS and MAGILL and come from the laboratories of the international health division of the Rockefeller Foundation, record a study of the antigenic relationship of 23 strains of influenza virus and 1 strain of swine-influenza. The investigators used virus grown on the developing egg and sera obtained from rabbits bled eight days after a single intraperitoneal injection of virus; previous work had shown such sera to be highly specific. The strains were compared by neutralisation tests, the mixtures being inoculated intranasally in mice, and 16 of them were also examined by cross-immunity tests in actively immunised mice. The conclusion reached is that although there certainly are antigenic differences between strains of influenza virus these differences are not so clear-cut as to warrant the recognition of types. Though certain strains appear dominant, the differences between strains of epidemic influenza virus are less than those between the human and the swine group. Human strains, especially those isolated from the same epidemic, are closely related, and FRANCIS and MAGILL think that a sufficiently broad immunity could be produced in man by three injections of a vaccine made from a single potent strain, the alternative being to make a vaccine from strains embracing the major antigenic variations.

The third paper is by the Hampstead workers WILSON SMITH and C. H. ANDREWES, who have examined 28 human strains by cross-neutralisation and cross-immunity tests in mice. They used mouse-lung filtrates and sera obtained from ferrets, and like the American workers they found that the strains showed considerable antigenic variation; indeed they believe that probably no two strains are exactly similar in their antigenic constitution. However, among these various antigenic components they were able to recognise four major antigens, and on the distribution of these four antigens they have classified strains as specific, non-specific (or "master" strains), and those intermediate between these two extremes. Cross-immunity experiments in mice reflected the antigenic make-up of the strain used for immunisation; it was primarily a homologous immunity. On the other hand the immunity of the recovered ferret was shown to be considerably broader and it seems evident that the basic immunity possessed by the ferret can be reinforced by the injection of heterologous vaccines almost as well as with a vaccine made from the homologous strain. Since in the opinion of SMITH and ANDREWES the ferret with some basic immunity represents a closer parallel to human adults than do normal ferrets or mice, the immunisation of man may not be quite so difficult as the existence of so many strains of influenza virus suggests. In theory, they say, the non-specific "master" strains should be the most valuable for human vaccination; but unfortunately the non-specific strains they have so far encountered give mouse-lung filtrates of only moderate titre; and since the immunising potency of a vaccine depends on its virus protein content, any advantage gained by using the non-specific strains with a broad antigenic make-up would be offset by the low concentration of the different antigenic components. The same argument would apply to a polyvalent vaccine, for the dilution brought about by mixing the virus suspensions might reduce important antigenic components of the vaccine below an effective concentration. Accordingly SMITH and ANDREWES conclude that probably a high-titre intermediate strain would be the best to use for human vaccination. They are, of course, fully aware of the risks of deducing too much from animal experiments, and they point out that only a trial in man can give any true idea of the comparative efficacy of the different vaccines.

NEOPLASMS OF THE TESTIS

MALIGNANT disease of the testicle excites much more interest than is warranted by its relatively low incidence. It is often dramatic in onset and course, may spread very rapidly, and is intractable in the sense that a radical operation is difficult to devise and to execute. Indeed the prognosis of cancer in this situation has been regarded as almost hopeless, and the patient cured by orchidectomy as something of a surgical curiosity. Surgeons have come to adopt an attitude of such fatalistic gloom, both in teaching and in practice, that therapeutic measures have been undertaken in a half-hearted spirit discouraging to both patient and doctor. The discussion held at the section of surgery of the Royal Society of Medicine on Nov. 2nd suggests that these growths have too evil a reputation, and that modern means of diagnosis and therapy are likely to bring a more hopeful outlook. Mr. G. GORDON-TAYLOR surveyed the clinical aspects of the disease on the basis of 50 cases from the Middlesex Hospital and 50 personal cases, of which as many as 15 were growths in retained testicles. Mr. REGINALD PAYNE recorded a series of 38 cases treated at St. Bartholomew's Hospital during the years 1920–33 of whom 18 survived the five-year period. Dr. W. LEVITT discussed the principles and scope of radiotherapy in the form of deep X rays and emphasised the peculiar value of this procedure in testicular tumours. Three out of a series of 14 patients with gross secondary metastases, and 5 out of 6 to whom prophylactic treatment had been given, survived the five-year period. All the other speakers had had reason to appreciate the benefit conferred by deep X rays in advanced and apparently helpless cases, and the consensus of opinion favoured preliminary orchidectomy followed by irradiation as a routine procedure.

It is unlikely that much will be gained by carrying pathological subdivision beyond that of teratoma, seminona, and chorion-epithelioma, but it may well become possible to link histological characteristics with prolan A excretion, and with response to irradiation. The quantitative bio-

logical test of the excretion of prolan A in the urine seems to be a real help in diagnosis. Victims of the rare and quite hopeless chorion-epitheliomata are said to give the highest figures for prolan excretion, those with teratomata the lowest, the seminomata being intermediate. These results, obtained by American workers, have not yet been confirmed in any extensive series of cases in this country but are well documented. Even if the results are sometimes negative the routine use of this test in patients with any but the most straightforward testicular swellings should lead to earlier recognition and identification of tumours, to a reduction of the number of errors, and to an earlier and keener search for metastatic deposits. The exact mechanism of the prolan excretion in these cases is still obscure.

Irradiation in the form of deep X rays is now a proved weapon. Testicular tumours as a whole are remarkably radiosensitive, seminomata being even more responsive than the teratomata. Secondary masses, so advanced that if they arose from most other forms of malignant disease they would be beyond the range of treatment, may yield to irradiation to such an extent that the hosts are restored to reasonable life and activity, and in some of the cases caught early permanent cure has been recorded. A strong case could be made out for the routine treatment of all patients with testicular tumours by deep X rays, for if the tumour is radio-resistant this will soon be evident. Those patients subjected to orchidectomy who have no gross signs of secondary disease stand to gain most; some of them will surely have microscopic secondary growths. Whenever practicable irradiation should be preceded by removal of the testis because (1) orchidectomy alone will cure a few cases, and (2) disintegration by irradiation may give rise to serious toxic effects. In this country radical orchidectomy has never been widely practised, and many surgeons who once favoured it are now convinced that deep irradiation is preferable.

F. HINMAN is still an enthusiastic exponent of the major operation in America but most workers agree that its technical limitations make it an unsatisfactory procedure, whether performed to remove gross disease or as a routine prophylactic measure. It may be hoped that the more encouraging outlook will soon be reflected in a more enthusiastic therapy. Cancer of the testicle is still a deadly disease, but need no longer be a nearly hopeless one provided that practitioners are alive to the advances in diagnosis and treatment and see that their patients are not denied the help that these may bring.

ANNOTATIONS

NATIONALISM AND SCIENCE

IT is said that the advance of science transcends national frontiers; that a worker in any department of science, whatever his nationality, has in the other workers in that department a world-wide audience ready to receive anything of real pith and moment that he may have to communicate. Especially is this so, it seems, with medical science. Those who have made the attack on disease, whether by prophylaxis or therapeutics, their life-work are not likely to be deterred by nationalist feeling from adopting new means of increasing their efficiency. Can we safely conclude, then, that the onward march of science has acquired so much momentum that it is not to be seriously impeded by any obstacles that a narrow nationalism may seek to place before it?

It would be an unsafe conclusion. Nationalism is capable of doing much to impede the advance of science. The danger is not so menacing in medicine as elsewhere; for both doctors and patients are ready to welcome from any country ideas and expedients that hold out real promise of influencing the conditions that control ill health. But even in medicine, and still more in other fields of scientific work, there is danger that the striving for nationalistic self-sufficiency and for scientific support for preconceived political theories may canalise intellectual activity into narrow channels, impair intellectual integrity, and restrict the free expression of the human spirit. The danger is discussed in the leading article in *Nature* of Nov. 5th, in which reference is made to the letter in the *Times* of Oct. 29th signed by the Archbishop of York, the Bishop of Bristol, Sir Gowland Hopkins, Sir Thomas Holland, Sir Frederic Kenyon, Sir Richard Gregory, Mr. H. G. Wells, and others. The letter urges the establishment of a World Foundation with two objects—to foster the idea of world unity among all peoples, and to promote inquiries directed towards political and economic appeasement on all fronts. Unless we achieve a world unity in the search for knowledge and in the application of knowledge to human needs, the inheritance of modern civilisation may through national antagonism crumble into ruin.

Yet it is possible to take too gloomy a view of the position. Work conceived and executed purely in the interest of a particular nation may end in conferring benefits upon the whole of humanity. The Panama Canal was not made by the United States Government primarily to meet international requirements, but to facilitate maritime communications between the Atlantic and Pacific seaboards of the United States and so improve the naval defence of the country. But during the construction of the canal the work of Gorgas and his associates presented the whole world with a demonstration, unexampled in its thoroughness and success, of how science may serve to control disease. The canal was a national enterprise, but in many ways it has done much to promote progress in other nations. The work of the French pioneers in the reduction of infant mortality was partly inspired by the urge to counteract the decline in the birth-rate, which threatened to reduce the military power of France; but their methods have been adopted all over the world and have everywhere effected a remarkable saving of infant life. During the war measures to control disease among the troops and so increase the fighting strength of the different nations led to substantial advances in medical science. Gains in knowledge, even when sought for purely national advantage, have a way of spreading over a wider front and so conferring benefit on all nations. It is not easy to nationalise science and limit its onward progress by nationalist legislation.

As the scientific idea grows and spreads it must become increasingly difficult to divert scientific workers from the path of intellectual integrity.

DIET IN PREGNANCY

A LOGICAL basis for the assessment of the food requirements of a pregnant woman is the assumption that she should be able to provide for the needs of the fœtus and finish her pregnancy without any drain on her own resources. Dr. R. A. McCance and his co-workers have reviewed what evidence is available on the quantities of various food constituents that she should consume to this end, and have compared these quantities with the amounts taken by pregnant women.[1] They examined records kept of all food eaten during a week by 120 women from 3–9 months pregnant. The economic circumstances of the women varied: some came from the professional classes, some were wives of unemployed miners in distressed areas. The women were classified according to income (less rent) into six groups: those receiving less than 6*s*. (some had only 3*s*. 1*d*.), 6*s*.–9*s*., 9*s*.–15*s*., 15*s*.–25*s*., 25*s*.–40*s*., and over 40*s*. per head per week. While the intake of total calories and of fat and carbohydrate was little affected by income, it was found, as in other surveys, that protein, animal protein, calcium, phosphorus, iron, and vitamin B_1 rose steadily with income; more money to spend meant more milk, fruit, vegetables, meat, and fish. The actual amounts taken varied considerably from theoretical standards. The authors estimated that in view of the storage of nitrogen which occurs from the fourth to the ninth month about 90 g. of nitrogen is required a day, an amount only reached by the women with more than 25*s*. a week to spend. The view of some gynæcologists that protein should be limited in pregnancy is by no means unchallenged. McCance and his collaborators quote M. B. Strauss's contention that the toxæmias of pregnancy can often be traced to low protein consumption over a number of years, and E. Mellanby's comment that, were large quantities of protein harmful to healthy women, all Eskimo women would have long since died of eclampsia. As to calcium and phosphorus storage during pregnancy adds difficulties to the task of estimating the amounts required; the authors suggest that about 1·5 g. of calcium and 2 g. of phosphorus should be taken every day. No woman in the survey reached these figures; the averages for the richest group were only 0·94 g. of calcium and 1·45 g. of phosphorus, and in the three poorer groups the averages were below 0·6 g. and 1·0 g. respectively, in spite of the fact that some of the poorest mothers received dried milk (Glaxo) and Ovaltine through the National Birthday Trust Fund. The amount of iron taken should of course be sufficient to provide for the needs of the fœtus and placenta and for the blood lost at delivery without any drain on the mother. The iron content of the fœtus has been shown to vary widely from 266 to 937 mg. and might be greater still when the mother has been taking adequate medicinal doses; an intake of 18–20 mg. a day is suggested as desirable during pregnancy. Some individuals in the groups surveyed had received as much as 19·4 mg. but the average for the richest groups was only a little over 14 mg. and of the poorest group 8·6 mg. The inadequacy of the iron intake was emphasised by the correlation which the authors found between it and the hæmoglobin level. Most of the women who could presumably afford as much as they needed only took a total of about 2500 calories in the day. As there was no evidence they were losing weight, McCance concludes that this figure rather than the 3000 suggested by the League Commission is the average requirement of a pregnant woman. A practical difficulty which would arise were this value to be accepted is that to bring the diet suggested by the League down to the new figure the fats would have to be reduced drastically and would be still less in accordance with the habits of western European and American women. The general conclusion reached is that although some diets could be improved by better spending and although in time the well-to-do may learn to choose their food wisely, the vast majority of pregnant women cannot afford the food they need. The authors point out the difficulty of achieving better nutrition by giving money or meals and they suggest that medicinal supplements, though clearly not the ideal method of supplying dietary requirements, are likely to provide the best immediate solution to an urgent problem.

[1] *J. Hyg., Camb.* September, 1938, p. 596.

DEUTERIUM IN BIOLOGICAL EXPERIMENTS

AN ingenious method of approach to many of the problems of intermediary metabolism has been successfully applied by Schoenheimer and Rittenberg.[1] It consists in the "labelling" by heavy hydrogen of biological substances which are then administered to living organisms; the heavy-hydrogen content of various tissues and substances found in the tissues is then determined. Barrett, Best, and Ridout [2] have used this method in the study of problems of fat mobilisation giving particular attention to the assay of the heavy hydrogen deuterium. The compound or tissue to be tested is oxidised and the water formed is analysed for deuterium oxide either by an interferometric method or by specific-gravity measurements. An ingenious application of the torsion balance has enabled the speed of the latter method to be increased considerably and the outcome of the experiments has been a useful addition to the known facts of fat mobilisation.

Barrett and his colleagues fed mice with a diet containing linseed oil into which deuterium had been introduced by a palladium catalyst. By subjecting the animals to various procedures, and by determining the amounts of liver fat and depôt fat as well as the amount of deuterium in these fats, they have obtained clear evidence of fat mobilisation from the depôts to the liver. When the mice were starved, after injection of certain anterior-pituitary extracts, and after exposure to carbon tetrachloride vapour, it could be shown that the body depôts were the principal, if not the only, source of the excess fat which accumulated in the liver. In one group of experiments the mice were fed first on a diet containing deuterium fat, and then on one low in protein and other lipotropic factors but rich in carbohydrate. Since the fat which accumulated in the liver contained a very much lower percentage of deuterium than that in the controls, it was considered unlikely that it was derived from the depôt fat; this interpretation of the results was strengthened by the observation that the deuterium content of the depôt fat did not decrease during the administration of the high carbohydrate diet. The most probable explanation is that the accumulation of fat within the liver was formed from carbohydrate.

The use of deuterium in investigations of the inter-

[1] Schoenheimer, R., and Rittenberg, D., *J. biol. Chem.* 1935, **111**, 175, 183.
[2] Barrett, H. M., Best, C. H., and Ridout, J. H., *J. Physiol.* Sept. 16th, 1938, p. 367.

convertibility of protein, carbohydrate, and fat is a logical development of these experiments which may yield important results.

A LARYNGOLOGIST ON THE HÆMOLYTIC STREPTOCOCCUS

IN his Semon lecture, delivered at the house of the Royal Society of Medicine on Nov. 3rd, Mr. W. M. Mollison passed beyond the borders of laryngology into the regions of bacteriology and public health in discussing some of the activities of the hæmolytic streptococcus. In the late war, he said, according to L. Colebrook, no less than 90 per cent. of wounds not immediately sewn up became infected by it; in many ear, nose, and throat wards it is a frequent cause of scarlet and allied fevers; as a throat infection it is probably the cause of rheumatic fever. In the majority of human septic infections the organism belongs to Group A; but as within this group there are some thirty types or strains artificial immunisation of the whole community becomes impracticable. In the attempt to track down the source of infection, it is not enough to find hæmolytic streptococci in the throats of suspected carriers as well as in the infected patient; they must be proved to belong to the same strain—a very arduous task. Mr. Mollison cited some interesting cases in which this had been done. Hæmolytic streptococci are found more often in carriers than in cases of acute infection; indeed, no other organism shows so high a disproportion between carriers and disease, for it is estimated that one in seventeen of the population is a carrier. In considering the factors which govern the frequent immunity to the organism he dwelt on the protective power of the tonsils and other subepithelial lymphatic glands claimed by Kenelm Digby. Mr. Mollison regards droplet infection as the principal method of spread, but he produced evidence to support the belief that dust-borne infection is commoner than generally supposed, and that hæmolytic streptococci can survive in dust for as long as ten weeks. The problem of dealing with carriers is a ticklish one; many maternity nurses are prohibited from working on account of a throat infection, when tonsillar enucleation might clear them, once and for all, of the organisms. Mr. Mollison is satisfied that cubicles largely prevent the cross-infection occurring in open wards, while in these wards barrier nursing by means of screens reduces the risk, especially if adequate veils or masks are worn by all who enter the wards, cubicles, or theatres. He severely condemned the idea that there is anything noble about a nurse, doctor, or attendant continuing work while suffering from a cold, sore-throat, or influenza.

POST-GRADUATE INSTRUCTION IN GERMANY

IN the last two years post-graduate education has been organised on a national scale in Germany, and on Nov. 4th Dr. K. Blome, who is responsible for the organisation, explained its workings in a lecture at the British Postgraduate Medical School. Instruction is controlled centrally by the Reichsärzteführer, and is divided into obligatory and optional sections. By a law passed in April, 1936, all German doctors under the age of 60, with the exception of university teachers, members of the public health service, and some others, must attend a three-weeks refresher course every five years. Since the bulk of the medical profession could not be catered for at once, a start was made with doctors in country districts and small towns, on the assumption that these have less opportunities for keeping up to date than their town colleagues, and at the same time have a graver personal responsibility because of their isolation from hospitals and specialists. During his course the country doctor must leave his practice and live at one of 65 specified centres, his wishes in regard to time and place being met as far as possible. He is boarded either at a hospital or at a special hostel near by. During his absence, if he cannot arrange for one of his colleagues to take his place, a central agency will find him a suitable locum. Each panel doctor receives a grant of RM.300, which covers about two-thirds of his expenses. The general outline of the courses is drawn up by the central authority, the details being left to local directors, who are to some extent guided by representatives elected by the members of each course. The lecturers, who are unpaid, are chosen from the ranks of university professors and the general and specialist staff of the various hospitals. Arrangements are made for doctors to visit factories, mines, and the like during their course, so that they shall know more of the working conditions of their patients. As regards optional studies, the main function of the central organisation is to coördinate the facilities available and prevent wasteful overlapping. In future, however, there are to be five academies for optional work—at Berlin, Vienna, Dresden, Hamburg, and Munich. Those at Berlin and Vienna will provide comprehensive teaching in general medicine and surgery and the main specialties. The Dresden Academy will deal with "natural" healing methods, Hamburg with tropical medicine and hygiene, and Munich with preventive medicine. This year a scheme has been instituted for the interchange with other countries of teachers and those seeking specialist training. Dr. Blome remarked that the compulsory courses have not only been welcomed by doctors but have also stimulated the demand for post-graduate instruction in general. The Führerschule in Alt-Rhese lies rather outside the sphere of post-graduate teaching. Here general practitioners, newly qualified men, and senior students are taught the principles of National Socialism, and the school is also open to chemists, midwives, dentists, and others associated with medicine with the aim of welding the country's health policy into a compact whole.

"RAPID" TEMPERATURE MEASUREMENT

IT is improbable that any inaccuracy, significant for practical purposes, is involved in taking the "body temperature" per rectum. For special purposes it may be necessary to use special instruments, but the actual measurement is one of those things that present no difficulty and give wholly reliable results. In other words, if we really want to know a person's temperature we can satisfy our curiosity with certainty. It would be useful to be able to read off, from an instrument, the output of the heart or the amount of renal glomerular filtrate, but these things cannot be done, and some preoccupation with method is therefore excusable and even essential. When it comes to the measurement of temperature, however, we may be pardoned for carefully scrutinising the motive for introducing new means of obtaining the desired information. A legitimate one would be greater convenience, but this has long been satisfied by recording from the mouth or axilla; when much is at stake, convenience is sacrificed. A group of investigators [1] in Boston, Massachusetts, plead greater speed as a consideration powerful enough to warrant

[1] Benedict, F. G., Benedict, C. G., Lee, R. C., and Lee, H. B., *New Engl. J. Med.* Oct. 6th, 1938, p. 509.

the installation of a delicate and expensive apparatus which at best gives only an indirect measurement. It consists of a thermopile on which the subject breathes through a cardboard tube which can be discarded. A galvanometer and an apparatus to keep the "cold junction" at a constant temperature are necessary. The galvanometer carries a mirror which reflects a spot of light on to a measuring scale, and the maximum reading is noted. A simple procedure of calibration must be gone through on each day before the instrument is used.

The authors claim that "for both the normal and febrile states the rectal temperature may be estimated to within ±0·5 by adding 2·2° F. to the measured maximum temperature of expired air. These measurements may be taken at the rate of four per minute, which makes it possible to survey large groups of individuals in a relatively short time. The method seems to be particularly applicable to temperature measurements on school children during epidemics of 'colds' and influenza." But fifteen minutes' rest in a warm room is required to offset the effect of breathing cold air or of mouth-breathing due to muscular exertion, while in any case a "preliminary two-minute period of nose-breathing without talking ensures a condition for correct measurement." Furthermore, the "subject inhales through the nose, drawing a breath into the lungs to a moderate depth and holding it for five seconds; if desirable the nostrils may be closed by the subject's fingers. At the end of this time (indicated by the operator) the subject quickly puts the cardboard tube into his mouth, closes his lips about the tube, and exhales through the mouth." The claims for the method are based on repeated measurements from 10 subjects; whether they would be advanced with such confidence after trial on a roomful of school-children is a matter for conjecture. The preliminaries obviously require an assistant, and candidates would not be lacking who would be prepared to challenge a speed record if they were given a dozen clinical thermometers and a nurse. The time required for calibrating the instrument and for calculating the final results must also be taken into account. To sum up, it seems that the apparently constant relation between maximum breath temperature and body temperature is an interesting fact which should be borne in mind, but further proof of its practical value is required.

DIGITALIS AND CARDIAC WORK IN HEART DISEASE

ATTEMPTS are continually being made to decide how digitalis produces its effects, and how far it is useful. That it acts directly on the heart has been doubted [1]; experiments on the isolated dog's heart have shown no increase in efficiency, and the cardiac effects observed in man are held to be secondary to changes in the peripheral circulation. After clinical studies, however, H. J. Stewart and his collaborators [2] dismiss the idea that these peripheral vascular changes are important, and they conclude that the action is directly on the myocardium, being the same in all forms of heart disease—namely, an increase in work per beat. Their observations were made on two groups of cases: one with rheumatic heart disease, with activity not limited or only slightly limited, and the other with congestive heart failure of varied origin. With patients in the basal metabolic condition measurements were made of cardiac output, oxygen consumption, pulse-rate, vital capacity, arm-tongue circulation time, and venous pressure, and an electrocardiogram and a 2-metre radiogram were taken. During the next twenty-four hours each patient received digitalis 1·8 g. and the observations were repeated at the end of this time and subsequently. In most cases a reduction in size of the heart was found, but the accompanying change, if any, in cardiac output varied. In patients with congestive failure the output increased, whereas in those with slight symptoms or none there was either an increase, a decrease, or no change. Consistently in both groups an increase in work per beat was recorded, which implies a reduction in heart-rate or an increase in arterial tension in all cases showing a reduced or unchanged output per minute. The rhythm, whether normal or fibrillating, made no difference to the effects observed. In all cases it was found that digitalis caused a shift towards "normal circulatory function"—i.e., a favourable alteration in the ratio between left ventricular work and cardiac volume. The results are held to show that digitalis may properly be given to some patients with heart disease but without appreciable failure, though it appears impossible to discover beforehand those that will benefit. In this group the observed changes are small, and this is significant in view of the fact that the measurements involved are not at all easy to make with precision. In the presence of gross failure, however, the changes are very considerable, both with normal rhythm and with auricular fibrillation.

[1] Katz, L. N., Mendlowitz, M., and Kaplan, H. A., *Amer. Heart J.* 1938, **16**, 149.
[2] Stewart, H. J., Crane, N. F., Deitrick, J. E., and Thompson, W. P., *Arch. intern. Med.* October, 1938, p. 547.

NEO-PRONTOSIL

THE earliest member of the sulphonamide-containing group of drugs to be used was that marketed under the name of Prontosil rubrum. This substance is almost insoluble in water, and for parenteral use a soluble azo dye was prepared and put on the market in this country. This drug is said to be less toxic than the original prontosil and certainly less toxic than sulphanilamide. In America the active substance from which Prontosil soluble (for injection) is prepared is called Neo-prontosil. It is available for purposes of investigation in the form of tablets and capsules which can be taken by the mouth and has been tried by this route at the Mayo Clinic in infections of long standing. W. E. Herrell and A. E. Brown [1] have given fairly large doses by the mouth over a considerable period to patients with chronic disease without causing obvious damage. The amount of drug they administered every day varied between 2·66 and 5·32 g. and was divided into five parts given at equal intervals throughout the twenty-four hours. In the more chronic cases a two weeks' course was given followed after an interval of two weeks by another similar one. The conditions for which neo-prontosil was given by the mouth were: (1) infections with hæmolytic streptococci, such as sore-throat, pneumonia, cellulitis, and abscess; (2) pneumonia due to the pneumococcus in which the specific serum was not available; and (3) chronic ulcerative colitis. In a series of cases of sore-throat caused by a hæmolytic streptococcus, the authors believe that the drug was of definite benefit. In two cases of septicæmia due to a hæmolytic streptococcus with positive blood cultures and septic fever, recovery followed the oral use of neo-prontosil alone. Herrell and Brown believe that the preparation affects the same organisms as sulphanilamide, even if not so promptly, and is less toxic. Their results in cases of chronic ulcerative colitis are set out in a separate

[1] *Proc. Mayo Clin.* August 31st, 1938, p. 555.

paper.[2] The drug was given to 16 patients, in 8 of whom no other treatment was attempted. One of the patients had been ill at intervals for over four years, and continuously for a year before treatment began. At that time he was having sixteen stools a day and radiological and proctoscopic examinations confirmed the diagnosis of chronic ulcerative colitis. He was given 3·88 g. daily for 17 days. A week after starting this treatment his motions were reduced to four a day and for the next six months he had only one or two (normal) stools a day. The remaining 7 patients showed considerable or even decided improvement. The authors think their results are worth following up, but suggest that early cases with mild or moderate involvement are most likely to benefit and that cases due to a streptococcus may respond differently from those due to other organisms. Further clinical trial of this treatment seems desirable, but we understand that the preparation for oral administration is not obtainable in this country.

THE ORIGIN OF STIGMATA

A SYMPOSIUM of theologians, philosophers, and medical men of the Roman Catholic faith on the subject of stigmatisation is analysed by Dr. F. M. R. Walshe in the *Catholic Medical Guardian* for October. In the past the term has been loosely used to imply cutaneous lesions or hæmorrhage in the situations of Christ crucified; intense pain without objective sign in these situations; lesions found at autopsy; and symbolic markings on the skin. The exclusion from consideration of those wounds which are caused by external violence was suggested by one of the contributors. Dr. Walshe deprecates this attitude, holding that the first function of such a study is to ascertain whether authentic stigmatisation exists. As a neurologist he is himself concerned with the strictly medical aspect of the question and examines with close attention the theories put forward to account for the lesion on a physical basis. He disposes first of the belief that states of mind may set in motion objective changes of a destructive order in the body tissues and produce gross local disturbance of functions not normally under voluntary control. The argument of those contributors to the symposium who attempted to invoke a physiological mechanism is also dismissed as irrelevant. Dr. Walshe points out that psychogenic pain is distinguishable from a primary sensory quality such as that felt after a prick or injury; it is a complex ideational state, an obsession about pain which leaves no mark of ill health and debility on the sufferer. Another contributor seeks to incriminate the lability of the vegetative nervous system in certain unstable subjects, but offers no suggestion as to how such a psychobiological process could occur. By a process of exclusion the conclusion seems inevitable that a genuine and spontaneous stigmatisation could not be explained by any natural process. But the essence of the problem is whether there has ever been a genuine stigmatisation in that sense; and Dr. Walshe answers it indirectly by a convincing demonstration of the relationship between all recorded cases and hysterical manifestations. However mysterious the pathogenesis of hysteria, its clinical recognition presents no difficulties. There is every reason to expect that the self-infliction of stigmata would be in accordance with what we know of the hysterical illness—a purposive act designed to create a certain impression; in this case one of extraordinary Catholic piety. And there the matter may well rest.

[2] Brown, Herrell, and Bargen, *Ibid*, Sept. 7th, 1938, p. 561.

CONGENITAL MYOTONIA IN GOATS

THE response of myotonia congenita and myasthenia gravis to various drugs has thrown light both on the physiology of muscle and on the nature of these rare diseases. A remarkable opportunity for further inquiry has now arisen; for a family of goats with myotonia has come to the notice of investigators. From Kolb's account[1] of these animals it is clear that they suffer from a muscular condition very like the myotonia seen in Thomsen's disease. The myotonia does not appear until the kids are over a month old. It is greatly increased by rest and by cold, and is relieved quickly by exercise. Contraction of the muscles produces the usual myotonic response. The electrical reactions do not show the characteristic features, but it seems likely that this is due to some difficulty in technique. A curious observation made by Kolb is that the nanny-goat showed no rigidity during the later part of pregnancy and for thirty-five days thereafter, and that rigidity did not appear in the kids until the same period after the birth. No definite abnormality was detected on histological examination of the affected muscles. The striking effects of quinine in relieving myotonia, and of Prostigmin in aggravating it, were evident in the goats as in man. Some other cinchona derivatives also relieved myotonia, but quitenine, quitenidine, Eucupin, and Atebrin did not. Pilocarpine aggravated myotonia, whereas atropine, adrenaline, potassium, calcium, magnesium, guanidine, and alcohol did not modify it. A possible reason why potassium chloride did not increase the myotonia, as it does in man, is that the amount given (1 g.) was too small. A dose five times larger might well have been appropriate.

This family of goats from Tennessee may provide useful information. The disappearance of the myotonia during pregnancy seems particularly important; it has not, so far as we know, been reported in human patients, though it is known that in myasthenia gravis pregnancy often has a striking effect, sometimes for better and sometimes for worse. The way in which myotonia and myasthenia react in opposite directions to various drugs is one of the most interesting of recent clinical discoveries.

HEALTH WORK OF THE LEAGUE OF NATIONS

THE achievement of collective security against disease has secured whole-hearted international coöperation. As long ago as 1920 the Temporary Epidemic Commission organised and conducted a successful campaign, at a cost lower than that of even the smallest warship, against typhus in East Europe. In 1922 more than half a million refugees of the Græco-Turkish war were inoculated against small-pox, cholera, and the enteric group, whereby incipient epidemics of these diseases were checked. Further valuable work in Greece was done by the Health Section in respect of the dengue epidemic of 1927–28 and in the reorganisation of the public health services in that country. In 1930 the Chinese Government sought the help of the Health Section in combating cholera and small-pox in the Shanghai area with the result that during the cholera season that summer only 127 cases occurred, and of these only 16 were fatal. Fighting or preventing epidemics, however, is only one aspect of the activities of the Health Section which has occupied itself also with certain outstanding scourges of the human race, such as malaria, tuberculosis, syphilis,

[1] *Bull. Johns Hopk. Hosp.*, October, 1938, p. 221.

cancer, leprosy, cholera, plague, and sleeping sickness. It has, moreover, introduced international standards for biological preparations, concerned itself with child welfare, and facilitated the exchange of medical knowledge and experience throughout the world. The story of its achievements is told in a small book [1] of which the epilogue deserves special consideration. It is noted that all the countries concerned in the wars now raging in Spain and in the Far East had shared enthusiastically in the international coöperation of the Health Organisation of the League, with the saving of life as its object, and the woeful contrast between the humanitarian and political tendencies of to-day are well defined.

In general terms, in the humanitarian sphere, coöperation for the common good is recognised as the only sane mode of action. In the political sphere, isolation, the assertion of sovereign rights, gangster rule on a large scale, predominate and threaten civilisation with destruction. It is becoming increasingly obvious, in a world brought close together by scientific inventions, that this illogical position cannot continue. Men can have world-wide coöperation controlled by reason, or they can have isolation, the rule of force and the rejection of reason; they cannot have both, for one will destroy the other. And the choice is literally and simply a choice. Which men choose is a matter of human will. Wars do not come. Men make them, because (for whatever ultimate reasons) they have not resolved to give up the war method. Coöperation does not come. Men make it; and its achievements are wrecked by the war method. Work like that of the Health Section of the League of Nations is on the one hand; destructive folly is on the other. It is not only in the face of disease that solidarity has become an imperious necessity.

This plea for positive constructive effort comes with added force when it is associated with a reminder of the most successful example in history of the coöperation of governments in humanitarian activities.

NEW SOURCES OF VITAMIN A

A NEW process making use of molecular distillation for extracting vitamin A from fish livers was described by Mr. F. H. Carr, D.Sc., at a meeting of the Society of Chemical Industry at Burlington House on Nov. 7th. Dr. Carr said that insufficiency of vitamin A is now recognised as a contributory cause of faulty development and ill health of a large section of the population. The epithelial layer of most of the linings of the body structure including the respiratory passages, ducts, and glands is adversely affected by its deficiency. Night-blindness, through a defect in the visual purple, is due to a shortage of vitamin A, and this is a common defect in schoolchildren. The new process has the advantage, among many others, of bringing into use new sources of raw material. The technique, which has been devised by a group of research workers in the laboratories of British Drug Houses Ltd., depends upon the use of an extraordinarily high vacuum—i.e., a pressure as low as a millionth of an atmosphere. Molecules of the vitamin, being smaller and lighter than the oily constituents of the liver, are removed at comparatively low temperatures and without decomposition, leaving the fatty constituents almost free from vitamin and available for other purposes. It will no longer be necessary to depend on the cod and the halibut as principal sources of this vitamin since the livers of most sea-fish have been found to be richer than the cod in vitamin A, and instead of being wasted they can now be used in the preparation of vitamin A in uniformly high concentration and free from fishy taste and odour.

[1] The Romance of the Health Work of the League of Nations. By Kathleen E. Innes. Published by the author. Portway, St. Mary Bourne, Andover, Hants. 1938. Pp. 62. 1s.

A REASONABLE CANCER CAMPAIGN

THE King's Speech on Tuesday foreshadowed proposals to ensure the earlier and more effective treatment of cancer, and in his speech at the B.M.A. council dinner (briefly reported on another page) Mr. Elliot set out more fully what he had in mind. I regard it, he said, as a matter of urgent public necessity that we should make a sustained and organised attempt to deal with cancer on the broadest national lines. He spoke of the steady rise in the mortality-rate from cancer and estimated that no more than one case in four of cancer in an accessible site, and less than that where the disease is more deep-seated, is given the opportunity of cure or amelioration offered by the prompt application of modern methods. Mr. Elliot knows well the limitations of any such scheme and was careful not to promise too much; in the report of his chief medical officer (see p. 1136) it is admitted that the incidence is not likely to be reduced until the results of research have put into our hands means of prevention. But the salient fact is that a large number of cancer patients do not receive the benefits of modern knowledge, and that existing facilities are manifestly inadequate. Mr. Elliot described it as his aim so to extend them that they are available to every member of the community. Comparatively few hospitals are now able to maintain expensive equipment, a difficulty which, in Sir Arthur MacNalty's words, can only be overcome by more active coöperation between the voluntary hospitals and local authorities. Details of the scheme are still to be drawn up.

THE next session of the General Medical Council will open at 2 P.M. on Tuesday, Nov. 22nd, under the presidency of Sir Norman Walker.

Dr. A. E. EVANS, a commissioner of the Board of Control, has been appointed Lord Chancellor's visitor in lunacy in succession to Dr. Nathan Raw, who has retired.

Prof. J. B. S. HALDANE, F.R.S., will deliver a Lloyd Roberts lecture at the Royal College of Physicians on Thursday, Nov. 17th, at 5 P.M. His subject will be some problems of human congenital disease.

THE Royal Society of Medicine is holding a reception at its house in Wimpole-street at 8.30 P.M. on Tuesday, the 29th of this month. Sir StClair Thomson is to give a lecture on medical notabilities of the Victorian age, as seen by "Vanity Fair."

ELSEWHERE in our columns it is announced that Dr. Morley Fletcher is representing the Royal College of Physicians of London at the opening of the Royal Australasian College of Physicians at Sydney in December.

Dr. C. S. MYERS, F.R.S., has resigned the principalship of the National Institute of Industrial Psychology with which he has been associated since its foundation in 1921, first as director and then as principal. We are happy to learn that as honorary scientific adviser he will continue his association with the work of the Institute.

POST-GRADUATE LECTURES

MOST of the post-graduate courses arranged by London teaching hospitals at the beginning of the winter session were postponed because of the international crisis. As in previous years, however, we are publishing abstracts of some of the lectures delivered. Prof. Pilcher spoke at University College Hospital and Mr. Edwards at King's College Hospital.

CANCER OF THE LUNG

(PROF. R. S. PILCHER)

CANCER of the lung can be cured by operation, but most cases are inoperable when we first see them and the only chance of more cures lies in early diagnosis. Cancer of the lung usually starts in the larger bronchi and produces at first only trivial symptoms due to irritation and obstruction. A knowledge of these symptoms is of value in the diagnosis not only of early cases, but also of those which come up with complications or metastases of which the cause may be overlooked—e.g. bronchiectasis and cerebral tumour.

The early symptoms are non-productive cough, hæmoptysis, and slight dyspnœa. The cough is persistent; the hæmoptysis is slight but repeated; and the dyspnœa varies with the degree of obstruction, but complete occlusion of a bronchus is not necessary to produce it. Bronchial obstruction is followed by atelectasis and infection. Infection may cause bronchiectasis, lung abscess, or empyema. It is often for one of these complications that the patient first seeks advice, and the first indication of the condition may be an attack of pleurisy. In the presence of infection in the lung the cough becomes productive and there may be profuse purulent expectoration. General deterioration of health may precede thoracic symptoms. From a patient with slight malaise questioning may elicit trivial symptoms referable to the chest.

Pain is not an early symptom in uncomplicated cases, but its presence does not necessarily signify an advanced growth. It may be caused in several ways. Infective complications often lead to pleurisy with its characteristic pain. Atelectasis alone may produce a sense of discomfort, but seldom severe pain. Pleurisy may also arise from direct involvement of the pleura by growth. Constant severe pain not relieved by rest is likely to be due to direct or metastatic involvement of nerves or bone. The situation of pain is not always thoracic and may be abdominal. Apart from pain some patients complain of sudden abnormal sensations in the chest the cause of which is obscure.

In the absence of complications the only thoracic symptoms to be expected are cough, hæmoptysis, and dyspnœa. Hæmoptysis is usually recognised as a warning of serious disease, but cough and dyspnœa are easily dismissed as trivial.

The physical signs of growth are inconspicuous or absent. Signs of atelectasis or localised infection are the commonest. Without a careful examination signs of local spread or metastases will be missed, but in early cases physical examination is often negative and diagnosis is only possible by special methods. These are bronchoscopy, radiography, and sputum examination, of which bronchoscopy is the most useful. It is the only method by which the site and nature of the tumour can be determined and the only way of distinguishing between benign and malignant tumours. It is also of value in estimating operability.

Although bronchoscopy is the most important special method of examination it should be preceded by radiography. From the history and physical signs the most to be expected is a suspicion of cancer of the lung. A radiogram may add nothing or it may reveal atelectasis or its infective complications, or intrathoracic disease other than cancer of the lung. Again, it may show the disease to be inoperable. Radiography after lipiodol injection is of little value in diagnosing cancer. It may reveal filling defects, obstruction, or dilatation of bronchi, but these appearances are common to benign and malignant tumours, so that bronchoscopy will be necessary in any case. The presence of lipiodol in the lungs has not been proved harmless and it is by some regarded as a cause of post-operative atelectasis. Further light may be thrown on some cases by radiography after the induction of pneumothorax.

Of the third method—sputum examination—I have no personal experience. In the diagnosis of bronchial tumours it cannot replace other methods, but it would be of great value if it gave positive results in tumours of the periphery.

If use is made of these special investigations diagnosis will usually be simple. During the examination of suspected cases the investigation will reveal conditions other than cancer of the lung if these are present. Even after a tumour of the lung has been found certain difficulties may still remain. In bronchial tumours the histology of biopsy specimens is sometimes obscure. In the case of peripheral tumours biopsy is not available unless aspiration is risked, and it may be uncertain whether a tumour is benign or malignant, primary, or metastatic. Since most tumours are bronchial the second difficulty is not often met.

The diagnosis of the early operable case only has been discussed. There are many manifestations of the disease which I have not mentioned as they have no bearing on early diagnosis. Sometimes with a small growth the patient seeks advice because of metastases or complications. Of the former, cerebral tumour is the example to remember; of the latter, bronchiectasis, lung abscess, and empyema. Many intractable cases of these infections turn out to be due to unsuspected cancer of the lung.

Treatment should be surgical if the tumour is operable and the patient fit for a serious operation. The only treatment that seems adequately radical is dissection pneumonectomy with separate ligature of the components of the hilum. Operability is often difficult to estimate. In making a decision the information obtained by bronchoscopy is of great value and thoracoscopy is sometimes useful; in many cases, however, it cannot finally be made without exploratory thoracotomy.

Cancer of the lung is alleged to be on the increase. This increase is problematical and may well be only apparent and to be explained by greater interest and greater accuracy of diagnosis. The latter can be further improved by careful attention to the early symptoms—non-productive cough, hæmoptysis, and dyspnœa. These symptoms can never be regarded as insignificant and always call for thorough investigation, especially by bronchoscopy.

CARCINOMA OF THE STOMACH

(MR. HAROLD EDWARDS)

SINCE the beginning of 1934 I have examined 92 people with cancer of the stomach, most of them at King's College Hospital. That such a large number should be seen in so short a time shows how very common gastric cancer is. I have detailed notes of 75 of these cases, and the observations I am going to make are based upon a study of them.

The series includes 60 men and 15 women, a proportion of four to one. Most of the patients (45) were between fifty and seventy, but as many as 24 were under fifty, and 7 of the latter were between thirty and forty, the youngest being thirty-two.

I may say at once that, judging by this group, cancer of the stomach in young people is wellnigh hopeless. One patient refused operation, and of the other 6 I was able to do a radical operation in only 1, a man of thirty-seven. He died of recurrence in three months. There was a tragedy in his case, however, for clinically, chemically, and radiologically a duodenal ulcer was diagnosed, and he was treated in hospital for seven months before gastroscopy revealed a growth.

The histories of the others—those over forty—although a little more encouraging, make a depressing story. In only 20 of the 75 cases was I able to do a radical operation. Here are the facts:—

TOTAL NUMBER OF CASES	75
Clinically inoperable	8 : leaves 67
Refused operation	4 : leaves 63
Found to be inoperable at laparotomy	43 : leaves 20
(*a*) Nothing done in 24; 6 died; mortality 25%	
(*b*) Gastro-enterostomy in 16; 6 died; mortality 38%	
(*c*) Gastrostomy or jejunostomy in 3; 1 died; mortality 33%	
Partial gastrectomy in 20; 6 died; mortality 30%	leaves 14
Died from recurrence within 6 months ..	4 : leaves 10

Thus only 10 of these 75 people remain alive with any prospect of a cure. The longest survival in this series is three years and eight months. Curiously enough this patient was doubtfully operable, for he had an enormous mass, palpable before operation, and it was necessary to remove the transverse colon as well as the stomach.

It is interesting to note that the mortality from operation was practically constant, whatever the nature of the operation. Nearly as high a percentage of deaths followed a simple exploratory laparotomy as the very extensive operation of partial gastrectomy. It is true that the cases in the latter class were not so far advanced, but at least 4 of them were very near to the inoperable line. In 2 who died a total gastrectomy had been performed. Even if due allowance be made for the difference in the extent of the disease, there does seem to be a very much diminished resistance to operation in cases of cancer of the stomach. This may explain in part the difference between the mortality of partial gastrectomy for carcinoma (30 per cent.) and partial gastrectomy for chronic gastric ulcer, which is 8·3 per cent. in 72 cases.

ANALYSIS OF HISTORIES

I have analysed these 75 case-histories in the hope that through them we may learn how to better these appalling figures. In the very acute cases—usually in young people—little can be done as a rule, for the history is often a matter of a month or so. But in most of the others the history varies between one and three years.

Can we not, in some cases at least, make a positive diagnosis at an earlier date? It is true that the disease is often insidious in its early stages, and the patient may keep apparently fit until the growth reaches an advanced stage. If we judge the fitness of the patient by his appearance, and take as an index of this fitness a blood count, we may be sadly deceived. In many of these inoperable cases the total red count and the hæmoglobin were normal. In some, indeed, a high normal was obtained. In a man of forty-nine with an inoperable growth, the red count was 6·56 million and the hæmoglobin 104 per cent., and in a woman of fifty-five, equally inoperable, 6·1 million and 92 per cent. In fact, changes in the blood picture usually differ very little from those in chronic peptic ulcer.

An analysis of the symptoms themselves does, however, do something to help us. I have sorted the cases into the following types, which, while they may not always be sharply delimited, at least help us to obtain a clearer conception of the clinical picture.

Type I. Epigastric pain.—Usually the onset is insidious and unrelated to meals. The pain soon becomes fixed and constant, and is associated with loss of appetite and eventually loss of weight.

There were 33 such cases, of which 9 were operable. This word operable perhaps needs some explaining, for obviously the criteria of operability vary with different workers. I take a somewhat extreme view, and if there is any doubt in my mind as to whether a growth is operable, I always regard it as such, and proceed with the radical operation. This means that many of the 20 cases in whom a partial gastrectomy was performed were very advanced—in particular the 4 in which recurrence came soon after operation. The length of history in this group varied from six weeks to three years, but the average was one to two years. Many of these cases did not reach me until vomiting from pyloric obstruction had begun.

Type II. Insidious onset.—In 11 cases, of which 3 were operable, the onset was insidious in the extreme. No pain was experienced until the disease was far advanced—in 3 there was, indeed, no pain at all. The symptoms are various and include abdominal discomfort after meals, distaste for food, occasional nausea, and eructations. In one case foul eructation was the only gastric symptom of an enormous cauliflower growth, associated with lassitude and loss of weight. The average duration of symptoms in these 11 cases was twenty-two months.

Type III. Resembling gastric ulcer.—In 13 cases the symptoms closely resembled gastric ulcer in periodicity and response to alkaline powder. These are the dangerous ones, for all run the risk of being treated medically, and 3 were treated in the medical wards here. They all respond to treatment, and may not only lose their symptoms but actually gain in weight, and their appetite may improve a little. These cases must obviously be a trap for us, a worse one even than those of Types I and II.

How can we contribute towards obtaining earlier operation in these three groups? I have formulated this working rule. If a patient over the age of forty-five, with a previously healthy gastric history, complains of pain of the gastric type, or of epigastric discomfort and loss of appetite, diagnose cancer of the stomach, and then seek by the various methods of investigation enumerated below to disprove it. I am certain now that this is the correct approach, and I deplore the text-book method of teaching that this *may* be A, B, C, or D. I would emphasise most strongly that relief of symptoms by diet, or by MacLean's powder, is absolutely no criterion that the condition causing the symptoms is of simple origin.

Type IV. Secondary to chronic peptic ulcer.—There were 9 such cases, in which the evidence is indisputable that cancer started in a pre-existing

chronic ulcer. The length of history varied from seven to twenty years. All were in men, and all save one were at the pylorus.

These observations are, to me, of great significance. I have never seen a peptic ulcer become malignant in women, and I do not take this risk into consideration in discussing the advisability of operation upon a chronic peptic ulcer in a woman. In men it means to me that ulcers on the lesser curve rarely become malignant, but that ulcers at the pylorus—that is, in the pyloric antrum—are especially liable to malignancy. Therefore I advocate operative treatment in every case of chronic peptic ulcer in the pyloric antrum in men, and eschew medical treatment.

Of these 9 cases, 1 refused operation, and in only 2 of the other 8 was a radical operation possible. One aged forty-one, with a ten years' history, was early; the other aged sixty-eight, with an eighteen years' history, was far gone, and died of recurrence in five months. A happier story could be told of this group if those who had to do with them in the early stages had been of my own persuasion regarding operation for pyloric ulcer.

The other types are small and relatively insignificant.

Type V. Pyloric stenosis the first symptom.—There were 3 such cases, all of which died after operation—2 after gastro-enterostomy and 1 after partial gastrectomy.

Type VI. Cardiac growths.—Here the symptoms are almost identical with those of carcinoma of the lower end of the œsophagus. There were 3 cases, in none of which was a radical operation feasible.

Type VII. Anæmia as the only symptom.—There was 1 such case in this series: a patient whose growth is, I am convinced, operable, but who steadfastly refuses operation. I have one excellent example of this type, however, in a patient not included in this series. She is a woman of fifty-six who is now in perfect health, having had a partial gastrectomy for cancer performed six years ago. She owes her life entirely to the energetic action of her doctor, Dr. Harold Moody, who diagnosed in her a secondary anæmia, and, although she had no gastric symptoms, did not neglect to have the stomach investigated in his search for a cause. He was rewarded by finding an early carcinoma.

Type VIII. Following previous operations upon the stomach.—I have had 2 cases of carcinoma arising in a stomach previously operated upon for ulcer; one patient was a man for whom a gastro-enterostomy for duodenal ulcer was performed twenty years ago, and the other a woman who ten years previously had had a partial gastrectomy for gastric ulcer. Such cases are rare, and their symptomatology complicated.

May I repeat now the rules I have laid down for myself with regard to the clinical diagnosis of gastric cancer?

(1) Diagnose as cancer all cases over forty-five which, having a previously healthy gastric history, develop gastric symptoms, and seek to disprove it by investigation.

(2) Operate on all cases of chronic ulcer of the pyloric antrum occurring in men.

(3) Do not overlook the stomach in the search for a cause of obscure secondary anæmia.

INVESTIGATIONS

(1) *Physical examination* is not often a help in the early stages of gastric cancer. In 17 of my 75 cases a lump was palpable. I want to stress, however, that the presence of a lump does not mean inoperability provided the lump is movable. I was able to do the radical operation in 4 of these 17 cases.

(2) *Laboratory investigation.*—I have not found the examination for occult blood of much service, although perhaps it is an academic sin to say so. Investigation of the gastric juices may be a considerable help, but is not in itself diagnostic. Achlorhydria is the rule—in only 4 of these cases was free acid present in the resting juice, but in 5 others there was a brisk response to histamine. In one case the acidity was normal.

(3) *Radiography and gastroscopy.*—I mention these together, for to me they are inseparable. Apart they are useful, but used in conjunction the efficiency of diagnosis may reach a very high standard.

After four years of gastroscopy I have come to regard it as indispensable, and in a considerable proportion of these cases the gastroscope has been essential to diagnosis: in some cases by direct inspection of the growth; in others by inference from the type of mucosa it has revealed; and, perhaps as important as anything else, in a negative way, in exonerating a stomach under suspicion. For many patients are thus saved the discomforts and dangers of that now obsolete operation, "exploratory laparotomy? carcinoma of the stomach."

SPECIAL ARTICLES

MEDICINE AND THE LAW

Intervening Cause in Homicide

THE case of manslaughter unsuccessfully put forward by the prosecution in R. *v.* Breese at Denbigh assizes last week will recall a line of interesting decisions on the chain of causation. What is the effect on the alleged assailant's criminal liability when, although the injury was insufficient in itself to cause death, the patient dies during a surgical operation which would not have been undertaken but for the infliction of the wound? The prosecution said that Breese had shot his brother-in-law, Francis Jones, with a bullet from a rook-rifle which lodged in the patient's neck. During an operation for removing the bullet the surgeon was sitting on a stool. He had made a cut and had located the bullet when the stool slipped and he fell on his back on the floor. Changing his gown and gloves as a precaution, he resumed his task but found that the bullet had moved and was unable to locate it again. But for the mishap the bullet would have been out in five or ten minutes. Owing to the delay anæsthesia was prolonged. The patient was under chloroform for 1 hour and 40 minutes. Post-mortem examination showed an enlarged thymus gland. Whether this condition contributed or not, the breathing became weaker and the man died under the anæsthetic. Medical witnesses expressed the opinion that death was due to the effects of chloroform and shock. The prosecution submitted that Jones would not have required anæsthesia if he had not been shot by Breese. The defence replied that Jones did not die through any act of Breese, but from a series of unfortunate accidents for which Breese was not responsible. Mr. Justice Hilbery said the jury must ask themselves whether death ensued from an operation advised by medical men; that was the question upon which controversy in the case arose; nobody, he said, suggested that Jones was kept an abnormally long time under chloroform. Actually, however, these issues were probably immaterial in the mind of the jury as there was evidence that the

injury was sheer accident. Breese denied having fired the rifle. He said the rifle, which belonged to him, was brought out in order to frighten Jones (who had, he stated, insulted Mrs. Breese and had been drinking) and to persuade him to leave the premises. He did not know the rifle was loaded; he thrust at Jones with the rifle once or twice; Jones stumbled against him, and somehow the rifle went off accidentally. The jury found Breese "not guilty" on the charge of manslaughter and also on a second charge of unlawful wounding.

In cases where the injury has been deliberately inflicted, the jury must decide whether death is the natural consequence of the criminal act. In R. *v.* Davis and Wagstaffe (1883) a blow rendered operation advisable. Chloroform was administered and the patient died under the anæsthetic. He would not have died but for its administration. It was held that his assailant was liable to be indicted for manslaughter. In an earlier case, R. *v.* McIntyre (1847), the accused kicked his wife and a surgeon gave her brandy as a restorative. Some of the brandy "went down the wrong way" and entered her lungs and might have caused death. The courts ruled that it was sufficient to allege in the indictment as the cause of death the blow which made the application of the brandy desirable. The technicalities of indictments are nowadays simplified, but it remains the law that it is no excuse for the accused to put forward some other malady as the reason for the injury proving fatal. This principle is illustrated by R. *v.* Flynn (1867) where the man whom Flynn had struck walked two miles afterwards to the police barracks and rode home four miles next morning. The medical evidence was that the reaction of the walking and riding accelerated death. But for it, the patient would have had a better chance of recovery. Death was due to compression of the brain. The blow alone was not enough to cause death; the injured man was more likely to recover if he had not undertaken the journeys. It was held that the judge was right in directing the jury that, if they believed the doctor's evidence, they should find Flynn guilty. An Irish case, R. *v.* Quane (1836), is on similar lines. Owing to a blow it was necessary to amputate one of the victim's limbs. He died of lockjaw some days after the operation, which had been performed with ordinary skill. The court ruled that, as the blow was struck with malice prepense, the offence amounted to murder. On the other hand, an Indian case (1877) is reported which shows that an intervening cause may exempt the accused from liability. During an altercation one man gave another a push in the back and thus caused him to fall several feet into a road below. He sustained an injury from which tetanus followed; death occurred five days later. The accused was held not guilty of culpable homicide; the act did not amount to murder inasmuch as there was no likelihood of the actual result and all the less evidence of an intention to produce it.

Three points remain to be mentioned. First, if an operation is rendered necessary by a deliberately inflicted injury, the accused will not be guilty of murder if death is due to the negligence of surgeon or doctor. In R. *v.* Pym (1846) a man had been wounded in a duel and competent surgeons had in good faith advised an operation. The patient died and it appeared that the surgeons had been mistaken over the need for operating. The accused was nevertheless guilty. On the other hand, in the familiar case cited in early text-books, if the surgeon applies poison to the wound either from bad faith or negligence it is the surgeon and not the inflicter of the wound who has killed the victim. Secondly, if the blow renders medical attention necessary and the victim declines to undergo treatment or operation, the accused is not thereby exonerated. In R. *v.* Martin (1832) a man struck a woman with a hammer on the back of the neck. The surgeon found a bruise over the spine. The woman was not in a good state of health and was advised to remain in the hospital but refused to stay. Mr. Justice Parke remarked that the defence had urged that the woman was in a bad state of health. "That is perfectly immaterial; if the prisoner was so unfortunate as to accelerate her death, he must answer for it." Lastly in every case of homicide it must be proved that death results within a year and a day from the alleged criminal act. The law sets up an unanswerable presumption that, if death occurs after that period, it must be due to some other cause. This presumption was relied upon in R. *v.* Dyson (1908). In November, 1906, the accused seized a 3-month-old child and flung it down and beat it. The skull was afterwards found to be fractured. Prosecuted at the Salford police-court under the Prevention of Cruelty to Children Act (nowadays replaced by the consolidating Children and Young Persons Act), he was sentenced to four months' imprisonment. In December, 1907, he beat the child again. He was prosecuted in January, 1908, and sentenced to six months. On the following Feb. 17th the child was admitted to hospital suffering from traumatic meningitis. It died on March 5th. At the time of its admission to hospital all external marks of the violence of the previous December had disappeared. There was medical evidence that a fracture of the skull of so young a child would destroy the brain tissue and cause death eventually, though the child might live with such a fracture for some few years; the fracture was the main cause of death; subsequent acts, if any, would accelerate death. Dyson's defence was that the original fracture in 1906 was the sole cause of death. The Crown contended that the injuries at the end of 1907 accelerated it. On his being found guilty, Dyson appealed to the Court of Criminal Appeal. There Lord Alverstone, L.C.J., observed that the proper question was whether the prisoner accelerated the child's death by the injuries inflicted in December, 1907. If he did, the fact that the child was already suffering from meningitis from which it would in any event have died before long would afford no answer to the charge of causing its death. In the circumstances, it will be seen the defence that a year and a day had elapsed was useless.

BRITISH FUND FOR THE RELIEF OF DISTRESS IN CHINA.—Dr. H. Gordon Thompson, secretary and treasurer of this fund, has received a letter from Madame Chiang Kai-shek acknowledging a recent gift of 150,000 dollars for the refugees in Central China, and expressing the gratitude of herself, the Generalissimo, and the people of China for the generous and continuous help received from the British people. The address of the fund is 121, Westbourne-terrace, Paddington, London, W.2.

LECTURES ON THE UNCONSCIOUS.—Three lectures on some clinical, religious, and theoretical aspects of the unconscious are to be held under the auspices of the Analytical Psychology Club at B.M.A. House, Tavistock-square, London, W.C. On Nov. 25th Dr. Culver Barker will speak on the positive values in neurosis; on Dec. 2nd Mr. James Kirsch on the religious aspect of the unconscious; and on Dec. 9th Dr. H. G. Baynes on the unconscious as the real object of psychology. All the lectures will be at 8.30 P.M., and tickets, which must be obtained in advance, may be had from Mrs. Game, 96, South Hill-park, Hampstead, N.W.3.

SWITZERLAND

(FROM OUR OWN CORRESPONDENT)

ACADEMIC CHANGES

SOME notable changes have occurred lately amongst the teaching staff of the Swiss universities. Prof. Fritz de Quervain, who in 1918 had succeeded Theodor Kocher as director of the surgical clinic in Berne, has retired, having reached the age limit of 70 but still enjoying good health and spirits. Under his directorship a new clinic has been built up which has maintained the traditions of Kocher's school. Prof. de Quervain has long been the leading surgeon of Switzerland, and over and above his extensive operative work he found time to continue his research studies. His wide knowledge and experience are embodied in his work on "Surgical Diagnosis" which has run through several editions and has been translated into about a dozen languages. Following in Kocher's steps he specialised in studies of goitre, the results of which are set out in his book on "Goitre" which was translated into English in 1924. Dr. Hermann Matti of Berne who succeeds him is already well known for his work on fractures and bone surgery.

The directorship of the children's clinic in Basle, vacant through Prof. Wieland's retirement, has been filled by the appointment of Prof. Ernst Freudenberg, formerly at Marburg. Prof. Freudenberg, who was one of the foremost German pædiatricians, was dismissed from his chair in 1937. His nomination to the chair gave rise to some discussion, but those responsible for the university insisted on the principle that the requisite scientific standard can only be maintained when the chairs are filled by the best available men. Switzerland, with its seven universities, cannot limit the teaching staff to its own nationals but must if necessary avail itself of foreign candidates. In Zürich the chair of medicine recently became vacant through the death of Otto Naegeli, the famous hæmatologist. His successor is Dr. Wilhelm Loeffler of Basle who made a name for himself as teacher and clinician when directing the Policlinic at Zürich.

"PÈRE GOUDRON"

Ernest Guglielminetti, who was born in Monthey (Canton Valais), the inventor and propagator of road tarring, was recently the guest at a congratulatory dinner in Brigue, when the freedom of that medieval town north of the Simplon was conferred upon him. The representative of the authorities of the Canton du Valais gave expression to his joy that for once the proverbial ingratitude of the republic was non-existent. Dr. Guglielminetti presented a historical picture to the town of Brigue. Dr. Guglielminetti lives in Paris, and is commonly styled by the French press as Père Goudron.

GOITRE

The campaign against goitre is beginning to show notable results. It was chiefly on the recommendation of Prof. de Quervain that iodine has been added to the common Swiss table-salt. Dr. Paul Lauener, medical officer of the schools of Berne, has published statistical evidence that goitre amongst school-children is clearly on the decrease. Dr. Lauener's statistics are based on yearly examination of about 10,000 children. In the period previous to the prophylactic goitre measures 35 per cent. of the children of the first school year, 55 per cent. of the fifth year, and 79 per cent. of the ninth year showed definite signs of goitre. The corresponding percentages are now 11·4, 12, and 10·3. The first systematic anti-goitre campaign was undertaken in the Canton of Appenzell under the supervision of Dr. Hans Eggenberger, surgeon of Herisau.

IRELAND

(FROM OUR OWN CORRESPONDENT)

FEES FOR IMMUNISATION AGAINST DIPHTHERIA

FOR some years past the campaign for immunisation against diphtheria has been carried on under an unpleasant cloud. The medical officers of health in all county areas have been anxious to establish efficient systems of immunisation, and in this they have had the full sympathy of the Irish Free State Medical Union and of the dispensary medical officers throughout the country. It was natural that full use should be made of the services of the latter, and no difficulty would have arisen in arranging terms between them and the local authorities had not the Department of Local Government and Public Health intervened to impose a scale of fees which the dispensary medical officers could not accept. The union, on their behalf, was willing to approve of a fee of 3*s*. 6*d*. per completed case, but on failing to get a settlement on this basis and on learning the fees that are current in Great Britain and in Northern Ireland, the demand was raised to 5*s*. a case. The highest offer made by the Department was 2*s*. 6*d*. per case. The matter has hung in this unsettled position for the last few years. In many areas the dispensary medical officers continued to perform immunisation, leaving the fee in suspense, and in others temporary whole-time medical men were employed for this purpose. Recently the union, while still dissatisfied with the offer of the Department, declared its willingness to advise its members to carry out immunisation in any area in which the county medical officer declared that the possibility of an epidemic was imminent. The dispute has recently come to a head in co. Clare, where angry charges against the dispensary medical officers were made by certain members of the board of health, and unfortunately also by the county medical officer of health. A statement of the position has been submitted to the board of health by the medical union, and it is hoped that an amicable settlement may be reached.

PRESENTATION TO SIR JOHN LUMSDEN

A presentation of his portrait, by Mr. Leo Whelan, R.H.A., was recently made to Sir John Lumsden, M.D., commissioner in Ireland of the St. John Ambulance Brigade, by the members of the brigade and some other friends. Sir John has been commissioner in Ireland since 1904, and was at the head of all St. John activities in Ireland during the late war and since. The portrait shows him seated and robed in the mantle of a knight of justice of the Order of St. John. The unveiling of the portrait was performed in the presence of a large assembly in the St. John Hall, Strand-street, Dublin, by Mr. W. G. Smith, commissioner for the Lancashire district, and formerly an assistant commissioner in Ireland. He and several others spoke of the great services rendered by Sir John through the brigade to the country during the past 35 years. The portrait will eventually hang in the St. John Hall as a permanent memorial.

PUBLIC HEALTH

Some Sections of the C.M.O.'s Report

IN the annual report of the chief medical officer of the Ministry of Health three groups of disease—tuberculosis, venereal diseases, and cancer—are accorded special sections, and these are responsible for so much suffering, both physical and mental, and for so much of the mortality during man's working life, that the reader looks with most anxiety for signs that they are being overcome. In the report for 1937 (to which attention was called last week) he may be disappointed, for only in the venereal group has there been continuous improvement.

TUBERCULOSIS

The considerable fall in mortality from pulmonary tuberculosis, which has been so satisfactory a feature in the majority of recent years, was replaced by a slight rise in 1937, and for the first time for many years there was an increase in the deaths from non-respiratory tuberculosis. The increase in the pulmonary group may be accounted for by the severe epidemic of influenza at the beginning of the year, which was followed by an exceptional number of new cases. In the non-pulmonary group there has been such a substantial decline since the war—the death-rate has been halved since 1921—that the small rise may not be of great significance. The incidence and mortality of pulmonary tuberculosis among young adults, especially young women, which have caused much concern during the past 20 years, have fallen rapidly since 1931, though they remain high in Wales and the north of England. More use is being made of the dispensary service, for the number of cases dealt with last year was the highest on record, and no doubt this points to greater confidence and coöperation on the part of practitioners. It is doubtful, however, whether the tuberculosis service is yet getting into touch with patients at an earlier stage. A considerably higher proportion of the tuberculous population is now willing to accept treatment in residential institutions, presumably because of their improved standard of comfort and increased facilities for modern treatment. The chief medical officer suggests that we may be suffering from a wave of over-enthusiasm for the surgical treatment of pulmonary tuberculosis, and he emphasises that the thoracic surgeon requires not only a special training in surgical technique but also a thorough knowledge of phthisiology to aid him in selecting suitable cases and deciding upon the correct time for operation. Experience of this kind of work is also essential in the medical and nursing staff which assists him, and for this reason major thoracic surgery at the smaller sanatoria is discouraged.

SYPHILIS AND GONORRHŒA

The number of new cases of syphilis with infections of less than a year's duration dealt with at treatment centres during 1937 was 5633, a reduction of 42 since the previous year and of 38·1 per cent. since 1931. There is evidence that at least 85 per cent. of patients coming under medical care are dealt with at these centres, and on this basis the total of new cases treated in the country would be about 6600, or 1·6 per 10,000 of the population. During the year the number of new early cases of gonorrhœa treated at the centres represented a rate of 8·4 per 10,000 of the population—a slight increase over 1936. This increase may well be due to a larger proportion of infected persons seeking treatment. Recent reports on the effect of the sulphonamide compounds in gonorrhœa have raised the hope that these drugs may do for gonorrhœa what the arsphenamine compounds have done for syphilis, in reducing incidence by rendering patients non-infectious quickly. The sulphonamides appear to be most effective when the patient's tissues have acquired a considerable degree of resistance to the gonococcus, and for this reason they are best not given as a routine until the disease has lasted two or three weeks. This is no great disadvantage, because most women at any rate do not seek treatment until the disease has been present for at least this time. Much has still to be learnt of the dangers of these new remedies and they should only be used under vigilant medical control. Probably the number of patients with venereal disease who obtain treatment soon after infection is still too few, especially in the case of women, and, although premature discontinuance of treatment becomes less common each year, it remains an important obstacle in the way of ridding the country of these diseases. This has lent considerable support to the suggestion that treatment should be made compulsory. It has been objected, however, that compulsory measures would encourage concealment, would press most hardly on those who sought treatment, and would be difficult to administer. Last year a mission appointed by the Minister of Health visited Denmark and Sweden where compulsion is in force. They were struck by the smoothness with which the arrangements worked, and found no evidence that the law led to concealment or to undue hardship. They found, however, that the degree of success in reducing the incidence of syphilis and of relative failure in gonorrhœa were broadly similar to those in this country.

CANCER

From the beginning of our national records of mortality almost every year has shown a rise in deaths from cancer, and last year the figure again increased from 66,354 in 1936 to 66,991. Although this rise is no doubt largely, and perhaps wholly, due to greater longevity and to more accurate diagnosis and certification, it means that treatment has to be provided for more patients every year. Investigations made by the Radium Commission and the Ministry of Health reveal that adequate facilities for early diagnosis and treatment are far from readily available to everyone in the country. A large number of cancer patients do not receive the benefits of modern advances of knowledge, and most receive treatment only at such a late stage that the prospect of cure is poor. Some form of extension of the present facilities is therefore clearly necessary, and this is envisaged in the King's Speech. The newer highly specialised methods of treatment can only be used in those comparatively few hospitals able to maintain expensive radiation equipment, and many patients therefore must travel unreasonable distances to obtain treatment. This difficulty can only be overcome by more active coöperation between the voluntary hospitals and local authorities, so that, while treatment would continue to be carried out in the hospital centres, the peripheral field work—the provision of advice to practitioners and the public, help with after-care and following-up, the investigation of local needs and so on—would be done by the local authorities. To a greater or less extent many authorities are already practising such coöperation with results which encourage their wider application.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A DOMINION DOCTOR

II

THOSE of us who have lived in the far places of the earth are often envied for having had "such interesting experiences." As one looks back one cannot recall that there was anything very thrilling about them. Certainly at the time one lived through the "interesting" experiences they seemed to have been heavily overshadowed by the daily discomforts, and even the high-lights were much dimmed by the general drab background.

As a very young man I was sent to what was 33 years ago one of the notorious plague spots of the world. I went to say good-bye to a teacher who had been very good to me and who had offered me a junior academic post. He said: "Well, I am saying this: I thought you had some sense; no man of sense deliberately chooses a wooden overcoat."[1] In due course I arrived at my station. There were twelve medical officers at the hospital to which I was assigned. On an average half were down with malaria at any given time. The food is best described in the words of the hospital matron: "It reminds me of Hebrews XIII—8." Being the most junior, I was promptly, by unanimous vote of the staff, appointed embalmer. One should explain that the bodies of Europeans had to be embalmed and kept until the relatives could be communicated with and their wishes as to disposal ascertained. My protest that I knew nothing about embalming, and that there were no books from which I could glean information, availed nothing, nor could my colleagues assist in any way. They confessed complete ignorance, and the only consolation I received was a hope that before a death occurred another junior might arrive and take over from me. But my luck was out. An American died within a few weeks of my arrival, and he chose to die about 8 P.M. Something had to be done about it. After a solemn consultation we decided that about 3 per cent. formalin should do the trick. I rigged up a Heath Robinson contraption and contrived to get a good deal of the solution into the circulatory system, and also injected some into the cavities. The body was placed into a metal shell which had a glass pane over the upper part of the lid. This shell in turn fitted into a wooden coffin, the lid of which was left unfastened because I wanted to be able to observe the progress of events. The whole was left in a corner of the post-mortem room. For some time I peered anxiously every day through the glass. Everything seemed right, so I stopped the inspection. One morning the mortuary attendant, a Jamaican negro, came into the laboratory in a state of jitters. He was quite inarticulate. All I could grasp was that he wanted me to follow him. He led me to the mortuary, fell back and pointed to the open door. I went in. There in the corner was a sight that fully accounted for Willis's state. The coffin lid was off, the glass panel shattered. Protruding through the hole, in a semi-sitting posture, was a monster head and torso, twice or more life-size, dappled purple-green. My embalming had not been good enough.

[1] Americanese for coffin.

This same Willis presented me one day with a letter. I reproduce it verbatim:

"Circumstances over which self-control lies absolutely dormant require my presence in Kingston, Jamaica, on July 15th, 1906, for a period of two weeks. At the expiration of this period of time I shall, D.V. (God willing), return to my present duties. Trusting that this my humble request will meet as usual with your generous response, I have" . . . etc.

When I asked what were the circumstances over which self-control lies absolutely dormant, he said solemnly: "I am going to be married, Sir."

* * *

Most of us who have had much experience of select committees and similar bodies remain unimpressed by the results of their deliberations and by the intelligence of some of the members selected to serve on them. A few years after the construction of the Panama Canal was started, a renowned engineer expressed the opinion that the site selected for the principal dam was unsuitable. There happened to be certain interests all too eager to seize on any pretext to discredit the Canal work, so a great deal of publicity was given to this matter. The upshot was the appointment of a Congressional Commission to visit the Canal and report to Congress. In due course the commission arrived. It fell to my lot to accompany it to the dam. The dam at that stage was essentially a great rock dump. We stood on the top of this dump overlooking the valley of the Chagres river gradually inundating the country to form ultimately the great lake. The chief engineer explained in detail why this particular site was chosen, the nature of the underlying rock, the methods adopted for the construction of the dam and its accessories, and so forth. When he had finished a long and very lucid exposition, a congressman from one of the south-western States, a large man in a black frockcoat, cowboy hat, with an unlit cigar in the corner of his mouth, said: "Colonel, I fully appreciate that this is a great engineering work. As a work of the hands of man, it is grand. But, compared with Nature's work, you will admit it is but puny. Do you mean to tell me that this wall of rock and earth, great as it is, can hold back the mighty forces of Nature dormant in that lake of some 400 square miles?" Colonel Goethals then patiently explained that the surface area had no bearing on the problem, and drew attention to the dykes of Holland keeping out the Atlantic ocean. The congressman said no more. As we were walking back along the dam, he happened to be next to me. He said: "Colonel Goethals is a great engineer?" I agreed. "Well, young man, you heard what he said about Holland and the Atlantic Ocean and about this dam. Well, he may be a great engineer, but I just can't believe that." I have met the prototype of this legislator among the members of parliaments of several countries, including Great Britain.

Engineers may be harassed just as much by a blind confidence in their capacity to surmount difficulties. In the East African Campaign the British forces were at a river with no bridge. It

was important to get them across as soon as possible. The Royal Engineers set to work and General Smuts came along to see how the work was progressing. He asked the O.C. Engineers how long it would be before the troops could cross, and was told at least 24 hours. He replied that the troops must cross that evening. The engineer muttered under his breath "The Old Man thinks I am Moses." But the General heard him. "Moses," he said, "Moses, my boy, lived thousands of years ago. I expect you engineers to have made some progress since then." The troops crossed that night.

* * *

Panama holds the record for the shortest and yet, it is submitted, most comprehensive Public Health Act. This is the presidential Executive Order which applied in the Canal Zone: "Anything which is, or may be, dangerous to human life or health shall be abolished." How much easier would be the task of public health officers if a similar Act applied in their countries! Even with this Act in force difficulties were not wanting. I remember one incident that caused us a good deal of worry. A health inspector found some fly-blown salt pork in a shop and destroyed it by pouring fuel oil into the barrel. The owner protested against this, and took it up with his wholesalers. The wholesalers wrote to the department and were referred to the Executive Order. They then wanted to know on what basis we considered fly larvæ dangerous to health. We said that the larvæ "may be," and we were therefore within the law in destroying the pork. They were not satisfied and took the matter to court. We knew that we would have considerable difficulty in proving that dead fly larvæ are, or even may be, dangerous to health. A decision against us would have meant a loss of prestige and a crop of many administrative difficulties. However, the court took this view: When a man buys a pound of pork he is entitled to receive a pound of pork and not, say, 15 ounces of pork and 1 ounce of fly larvæ. Without giving any decision on whether fly larvæ are a danger to health, the court held that we were entitled to destroy the pork to prevent defrauding the consumers. This decision may seem to have stretched things a bit, but we welcomed it with joy and gratitude.

* * *

We had a Canadian doctor with a French name in our mess. The Bishop, a fine Spanish gentleman, came on a visit and was dining with us. After dinner he turned to the French Canadian and said: "Doctor, tell me, what is the state of our Church in Canada?"—"I am telling you—the Church in Canada, Bish, is on the bum!"—"Excuse me, doctor, the idiom is a little strange to me: Bish, on the bum, please, what does it mean?" Before the Canadian could explain another member of the mess chipped in: "The doctor means that the state of the Church in Canada is not as he would have liked it to be."—"How very expressive: Bish, is on the bum—not as it should be. I really must remember this phrase. Thank you very much." I wonder if the dear old man ever used the words in that sense and what the reaction of his audience had been.

* * *

General Gorgas, who was a man of great personal charm, was a firm believer in the value of quinine prophylaxis against malaria. In every mess on each table there was a glass jar of quinine tablets or a bottle of quinine in rum solution. Placards enjoined people to take 5 grains of quinine daily. A couple of years' experience clearly demonstrated the futility of the measure, but Gorgas was known to believe in it, and no one was going to make him feel that he was wrong. You could—and did—curse everyone and everything in Panama, but the surest way of inviting a punch on the nose would have been to say something offensive about Gorgas. So whenever Gorgas visited a mess, everybody solemnly took quinine, and Gorgas to his dying day believed that quinine prophylaxis was vigorously and enthusiastically practised on the Canal Zone.

I once heard a very intelligent man say: "I know Colonel Gorgas is not a very good doctor, but if I were seriously sick, I'd rather have him than ten of the greatest specialists in the United States." I think this is the finest tribute I've ever heard paid to any medical man.

OBITUARY

MAJOR-GENERAL SIR MURRAY IRWIN, K.C.M.G., C.B., M.D. Dubl.

Sir Murray Irwin, who died at Bideford, Devon, on Nov. 7th at the age of 80, was a man of great administrative ability, and he did much during his long career in the Army Medical Service to raise it to its present pitch of efficiency.

James Murray Irwin was the second son of the Rev. James William Irwin, rector of Sharon, co. Donegal. He studied medicine at Trinity College, Dublin, and joined the Army Medical Department in 1882. He served with distinction in the Sudan campaign of 1898 and in the South African war, being mentioned in dispatches and awarded the Queen's and King's medals. The lessons of South Africa made reform of the medical service clearly necessary, and in 1903 Irwin, then lieutenant-colonel, was appointed to the staff of the P.M.O. at Aldershot at a time when medical units were making their first appearance with troops on manœuvres. In 1906 he joined the director-general's staff at the War Office, where he helped in the launching of the new college at Millbank. In the late war he became D.M.S. to Allenby's Third Army in France, and he was made a C.B. in 1917 and K.C.M.G. in 1918.

In manner Irwin was calm, dignified, and judicial. He was fond of country sports of all kinds and since his retirement devoted much of his time to municipal and country affairs in Devon. In 1884 he married Miss Nora Conlan, and he leaves a widow and one daughter.

VAUGHAN BATESON, L.R.C.P.E.

Dr. Bateson, who died in Bradford on Oct. 23rd at the age of 65, was the son of the Harrogate borough solicitor, and although educated at St. John's College, Cambridge, and a highly travelled and cultured man, he retained the characteristics of the Yorkshireman. For the last twenty-five years of his life he had practised in Bradford, identifying himself so completely with the civic life that policemen, firemen, and ambulance men attended his funeral as a matter of course. Actually he was an honorary sapeur and pompier of at least three countries. Qualifying at Leeds in 1897 he went out to India with a government appointment and soon found himself exploring Tibet. This led to a meeting with Rudyard Kipling which became a life association. Bateson was always quite unable to keep his experiences to himself. He was an attractive talker and story-teller and his printed works began with "The Himalayan Chemist"

and "Observations on Tibetan Medical Methods" going on to "Alchemy and Modern Science," "The Mystic Mind," "The Mystery of Life," and later to "What the Devil told the Doctor" and "Kipling and the Doctors." He himself described his recreations as geographical exploration, motoring, literature, aeronautics, aviation, and ballooning, oriental research—missing out a flair for campaigning, evident when during the war he commanded a mobile convoy with the Egyptian Expeditionary Force, and was later medical officer to a battalion of the Middlesex Regiment. In the *Times* a friend has described how "this bluff grey-haired Yorkshireman . . . older than most of us in the mess . . . always got his dressing-station incredibly close to the firing line" and was ready in broad daylight under Turkish artillery fire to rescue natives sheltering between the lines. At another time taking cover from a continuous barrage under a protecting ledge of rock near Tel Asur he talked for half an hour with his friend about books and Kipling in particular. Dr. Bateson leaves a widow and a daughter.

RAOUL BENSAUDE, M.D.

Prof. Bensaude died in Paris on Oct. 25th. His death has removed from us a most distinguished proctologist, whose treatise on rectocolic endoscopy, published just after the late war, was an event in the literature of pathology.

"Bensaude," writes C. H., "came to Paris from Portugal in the 'eighties, and before the end of the century he had published original work on agglutination, sero-diagnosis, paratyphoid infections, and Launois-Bensaude's disease. In 1919 he was appointed head of the department of diseases of the alimentary canal at the Hôpital St. Antoine, and this hospital was the centre of his professional life until the end. In association with this hospital he devised numerous instruments, and the Bensaude proctoscope is still one of the most popular in France. He was one of the pioneers of electrical methods for investigating the intestine, and among other activities he devised a protective screen for radiological examination, and instituted the use of creamy barium sulphate for X ray examination of the digestive tract.

"Perhaps he is best remembered in England for his introduction of quinine urea hydrochloride solution for the injection treatment of hæmorrhoids. Through the generosity of an American, he was able to found a proctological unit at his hospital, and those of us who had the privilege and pleasure of working there with him will always remember his kindness in making available the great wealth of clinical material which was to hand. He took as many pains to instruct and make friends with the most unimportant foreign student as he did with his own staff, and his patience at demonstrations was a thing at which to marvel. It must have been infinitely tedious to allow a series of eyes to peer through his instruments, but he never failed to show any pathological condition which he thought of interest. If the patient became restive, or the examination was unduly prolonged, he had the habit of calling to one of his dressers "Apportez-moi le bible," and he would then pick out an illustration from his own book which most nearly coincided with the lesion he was treating. It is said that when J. B. Murphy attended a congress of surgeons in London just before the war the introducer, after calling the names of those who were about to speak, gave the names of the towns or countries in which their work had first seen the light. Of the famous American surgeon, however, the introducer was forced to describe him as 'Dr. J. B. Murphy of the world.' The same remark might be easily applied to Bensaude, whose fame on the Continent was very nearly equalled by his reputation in the New World.

"Like many great men Bensaude's personal habits were of the simplest, and though as a host at his own table he was generous in his offerings of food and drink he himself partook only of the simplest and plainest fare. It is sad to think that one will never see him again presiding at his table, either at his flat in Paris, or at his delightful house at St. Cloud."

POL N. CORYLLOS, M.D.

By the death in America of Dr. P. N. Coryllos, thoracic surgery has lost an able clinician with a keen and original mind. Coryllos graduated in Athens in 1900 and later studied in Paris. He had a varied surgical career, serving with the Greek army during the Balkan war of 1912, in which he organised the first mobile hospital, and with the French forces during the war of 1914–18. Although he showed an interest in wounds of the chest in 1918, it was not until he was elected professor of clinical surgery at Cornell University in 1923 that he became recognised as a specialist in thoracic diseases. His publications have dealt particularly with pulmonary atelectasis and in 1928, in conjunction with G. L. Birnbaum, he advanced the view that pneumococcal lobar pneumonia possessed many of the features of a lobar atelectasis and sought proof from bronchoscopic investigation and in the size of the consolidated lobe which, he claimed, was smaller than the unaffected lobes. This attractive theory fits many of the facts but it has not been universally accepted. Later Coryllos attempted to show that post-operative pulmonary complications—atelectasis, pneumonitis, and bronchial obstruction—were phases of the same syndrome, and he drew attention to the importance of atelectasis in pulmonary tuberculosis, especially with regard to the closure of cavities. He conducted researches into pulmonary gas absorption in bronchial obstruction and atelectasis and into the clinical application of gas absorption in artificial pneumothorax.

But Coryllos was not engaged in the experimental side of medicine and surgery to the exclusion of clinical studies, for in 1934 he reviewed the results of 170 cases of thoracoplasty, and in 1935 he published his work on the Surgery of Pulmonary Tuberculosis. At Cornell he attracted a large following, and many of those who worked with him at his clinic owe to him their devotion to clinical research.

THOMAS STEPHENSON, D.Sc., F.R.S.E.

Dr. Stephenson, who died in Edinburgh on Oct. 29th, was not a medical man, but he was, without fear of contradiction, a medical journalist. More than thirty years ago he surrendered his pharmaceutical business in order to bring out a monthly magazine devoted to therapeutic subjects. At first it was hardly more than an aid to prescribing, with an issue of a thousand copies, but as it grew to maturity the *Prescriber* became a journal of cosmopolitan outlook and catholic content, with Stephenson as its creator, pilot, and inspiration. For long it has borne, without offence, the sub-title "A review of the progress of medical science" and has never lacked distinction. Many doctors must have used the periodical special numbers to keep their knowledge of endocrinology reasonably up to date. Stephenson was a man of many interests, including travel, literature, and music, and a prominent supporter of Rotary of which he once was president in the British Isles. Although in his 74th year he was until recently an active and youthful figure.

CORRESPONDENCE

CLASSIFICATION OF CHRONIC NEPHRITIS

To the Editor of THE LANCET

SIR,—Prof. Duguid begins his stimulating article in your issue of Oct. 29th with the remark that "No subject in pathology is more confusing to the student than the classification of nephritis." He rightly attributes this confusion to the system of drawing ætiological deductions from the histology of advanced lesions, and emphasises that the proper approach is the study of the disease in its various stages, tracing the development of the lesions from their onset. In his opinion this is impossible in the human disease and he has resorted to the production of experimental nephritis in rats.

The study of Bright's disease in its various stages is, however, not impossible. It is true that the early histological changes may be so different from the final picture that the pathologist is unable to recognise them as results of the same disease. The connexion can then be established only by a clinical study of the natural history of the disease. This necessary collaboration between pathologist and clinician was first achieved by Volhard and Fahr and their classification of Bright's disease, which appeared in 1914, is consequently the one with the greatest survival value. They were chiefly responsible for the introduction of the "vascular hypothesis" in the pathogenesis of nephritis, against which Prof. Duguid directs his remarks.

Subsequent clinical and pathological studies have justified the distinction which Volhard and Fahr made between the main group of chronic nephritis and the condition we now recognise as the malignant form of essential hypertension. Prof. Duguid insists however that "without more exact knowledge of the state of the kidneys in the early stages of hypertension it is difficult to know what relationship the nephritis may bear to it." In his Schorstein lecture on malignant hypertension (*Lancet*, 1938, **1**, 976) Prof. Arthur Ellis summarised the outcome of 10 years' clinical and pathological study directed to the attainment of this more exact knowledge. Prof. Duguid states further that "the vascular hypothesis has brought the classification of chronic nephritis to something of an impasse because it is so wide in its application." I should prefer to say that the recognition of malignant hypertension resolves one of the most obscure problems of Bright's disease and ranks with Allbutt's separation of the benign form of essential hypertension which he termed hyperpiesia.

The vascular theory is indeed wide in its application, for renal vascular lesions are almost universal in Bright's disease. Recent work suggests the probability that primary renal disease causes hypertension by way of a reduction in renal blood-flow; hypertension gives rise to arterial lesions and these in turn lead to progressive renal destruction. This breadth of application is not the danger of the vascular hypothesis but the keystone to our understanding of the chronicity and progressive nature of Bright's disease.

The experimental nephritis studied by Prof. Duguid is extremely interesting. Although its mode of production is highly artificial, the finding of a tubular nephrosis which subsequently progresses to vascular involvement, both in the kidney and in other organs, bears a close resemblance to the natural history of so-called parenchymatous nephritis in man. A further investigation of this parallelism would be a valuable outcome of these observations, and, on the available evidence, a more logical one than their acceptance as a basis for "rejecting the vascular hypothesis and throwing of the present system of classification into the melting-pot."

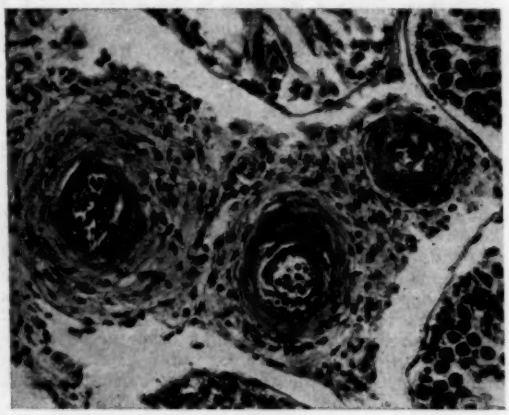
I am, Sir, yours faithfully,

CLIFFORD WILSON.

Medical Unit, London Hospital, E., Nov. 5th.

To the Editor of THE LANCET

SIR,—Prof. Duguid's paper has so important a bearing upon current views of the part played by vascular degeneration in Bright's disease that I beg leave to discuss briefly a few of the results of his experiments. In particular he mentions that "changes of the type associated with the so-called malignant nephro-sclerosis of man may be seen" when the nephritis resulting from the administration of Calciferol and acid sodium phosphate is severe. It was the recognition of these lesions in certain of his histological preparations which he kindly allowed me to examine in 1934 that prompted me to repeat his experiments and to attempt to trace stages in the evolution of these lesions.



Testicle of rat (×180) showing arteriolar changes.

In one group of rats only was I successful in obtaining the glomerular and severer vascular changes to which Prof. Duguid refers. In these rats many of the glomeruli showed focal necroses with fatty degeneration of the tuft, adhesions of the tuft to Bowman's capsule, and, in some instances, slight proliferation of the epithelium of Bowman's capsule in the neighbourhood of these adhesions. Glomeruli showing these changes were usually of normal size or somewhat swollen. In all except one of these kidneys a few of the cortical arterioles showed the acute necroses and proliferative intimal changes that are characteristic of malignant hypertension and of periarteritis nodosa, and are generally given the comprehensive term of "necrotising arteritis." These arteriolar changes were not, however, confined to the kidney but were demonstrated also in the pancreas, intestine, and most conspicuously of all, in the testicle (see Figure). It is thus impossible to agree with Prof. Duguid's interpretation of these vascular changes as the purely local sequel of a tubular nephritis.

In my other rats no glomerular nor arterial changes of the kind referred to above were obtained, the nephritis being limited to a severe degeneration and necrosis with calcification of the tubular epithelium, followed later by focal scarring of the cortex. The glomeruli and arterioles in such kidneys suffered no alteration beyond shrinkage when they happened to be included in the scarred areas, the arterioles being tortuous and their lumina narrow. In other areas both glomeruli and arteries appeared normal. These findings appear to agree with Prof. Duguid's, since he has observed glomerular lesions in 42 and arterial degeneration in 12 only of his series of over 400 rats. His figures suggest that the glomerular lesion cannot be interpreted as secondary to the arterial changes; in other words, as he concludes, it is not ischæmic. This conclusion is borne out by the actual histological changes. I can find no similarity between the glomerular lesions in this form of experimental nephritis and the glomerular lesions in ischæmic nephritis in man (D. S. Russell, 1929, *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 142, pp. 22, 54). On the contrary the glomerular lesions in these experiments resemble those that characterise chronic Bright's disease independently of any ischæmic factor. According to my interpretation, therefore, Prof. Duguid's results in no way invalidate the current view that progressive closure of the lumen of a renal artery or arteriole will lead to a certain characteristic series of changes in the parenchyma of the area supplied by the vessel.

I am, Sir, yours faithfully,

DOROTHY S. RUSSELL.

Bernhard Baron Institute of Pathology, the London Hospital, E., Nov. 3rd.

To the Editor of THE LANCET

SIR,—Prof. Duguid's paper raises the problem of chronic disease as such. I have not used his method of producing tubular nephritis, but can accept his findings, and I admire the excellent illustrations put forward. I cannot however accept his deductions and fail to comprehend, for instance, why he assumes that animals develop chronic progressive lesions of the kidney because of some partial or temporary damage to tubular endothelium which is not severe enough to incapacitate the animal. I cannot help thinking that in his experiments Prof. Duguid damaged not only the tubular endothelium of the kidney but other tissues as well, especially those forming a barrier between the blood stream and the ubiquitous organisms of the alimentary and respiratory tracts. Following this happening organisms frequently find access to the blood stream, just as they are known to do from a mechanically disturbed septic focus (cf. Parish and Okell, and Round and Kirkpatrick). My work indicates that such repeated bacteriæmias may cause capillary changes in the brains of mental patients and it is not unlikely that they are also the cause of chronic progressive lesions in kidneys already the seat of recent local tissue destruction. I am Sir, yours faithfully,

F. A. PICKWORTH.

Research Laboratories, Hollymoor Hospital, Northfield, Birmingham, Nov. 7th.

BULGARIAN TREATMENT OF POST-ENCEPHALITIC PARKINSONISM

To the Editor of THE LANCET

SIR,—I have read with interest the article on Bulgarian belladonna by Dr. Denis Hill, which appeared in your issue of Nov. 5th. As the use of unstandardised preparations of the drug is described, I would like to draw attention to the warning I gave a few months ago (*Pharm. J.* 1938, **1**, 240) that the alkaloidal content of Bulgarian root and its preparations is subject to great variation. I have found that Raeff's method may extract anything from 40 per cent. to 80 per cent. of the alkaloid present in the root; the decoction may therefore contain 0·012 per cent. or more of alkaloid, mainly hyoscyamine. It follows that one fluid ounce of Raeff's decoction may be equivalent to about 150 minims of tincture of stramonium (B.P. 1914) or about 250 minims of the 1932 tincture. The official maximum dose of the latter preparation is 30 minims, although, of course, much larger doses are normally given to parkinsonians.

Administration of unstandardised preparations is always unscientific, and in this case, owing to the high and variable potency, may be dangerous, and I therefore venture to suggest that the Bulgarian treatment should not be used unless each batch of the decoction or other preparation is examined for its alkaloidal content.

In view of Dr. Hill's statement that Neuwahl and Fenwick are the only other authors to have reported on this treatment in this country, I should like to draw attention to the work of Bailey (*Pharm. J.* 1938, **1**, 77) and Taylor and Hobart (*Pharm. J.* 1938, **2**, 49). Kuiper and van der Weilen have also made a thorough investigation (*Pharm. Weekbl.* 1937, **49**, 1546).

I am, Sir, yours faithfully,

RICHARD H. HENRIKSEN.

Pharmaceutical Department, West Park Hospital, Epsom, Surrey, Nov. 7th.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED OCT. 29TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2000; diphtheria 1432; enteric fever, 19 (40 "expected"); pneumonia (primary or influenzal), 578; puerperal pyrexia, 186; cerebro-spinal fever, 19; acute poliomyelitis, 70; acute polio-encephalitis, 4; encephalitis lethargica, 2; relapsing fever, 1 (South Westmorland R.D.); dysentery, 39; ophthalmia neonatorum, 87 (of which 22 in Birmingham). No case of cholera, plague, or typhus fever was notified during the week.

The incidence of poliomyelitis is now apparently on the wane, the combined notifications of acute poliomyelitis and acute polio-encephalitis being as follows for the current week and the previous fourteen weeks (working backwards): 74 88, 85, 68, 56, 63, 83, 76, 82, 76, 83, 87, 63, 41, 29.

The number of cases in the Infectious Hospitals of the London County Council on Nov. 4th was 2934, which included: Scarlet fever, 748; diphtheria, 1053 (carriers, 19); measles, 10; whooping-cough, 260; puerperal fever, 19 mothers (plus 12 babies); encephalitis lethargica, 273; poliomyelitis, 14. At St. Margaret's Hospital there were 24 babies (plus 7 mothers) with ophthalmia neonatorum.

Deaths.—In 126 great towns, including London, there was no death from small-pox or enteric fever, 1 (0) from measles, 2 (1) from scarlet fever, 5 (0) from whooping-cough, 27 (5) from diphtheria, 45 (10) from diarrhœa and enteritis under two years, and 22 (4) from influenza. The figures in parentheses are those for London itself.

Fatal cases of diphtheria were scattered over 19 great towns, 2 each at Southport, South Shields, Stanley, and Birmingham. Sunderland had 6 deaths from diarrhœa, Leeds and Liverpool each 3. Birmingham attributed 3 deaths to influenza.

The number of stillbirths notified during the week was 250 (corresponding to a rate of 38 per 1000 births), including 31 in London.

BRITISH MEDICAL ASSOCIATION

THE COUNCIL DINNER

Sir KAYE LE FLEMING presided on Nov. 8th at a dinner given by the council of the British Medical Association in the great hall of B.M.A. House, when Dr. J. B. MILLER proposed the toast of the Retiring Officers, Sir Farquhar Buzzard and Mr. H. S. Souttar. He described their metamorphosis from the larval stage in some such intermediate host as the science committee of the Association to their full glory at the representative meeting—over which body Mr. Souttar had presided for three years. In reply Mr. Souttar said that the medical profession was a fellowship of service, and paid a tribute to the late Sir Robert Johnstone, whose name had originally been associated with the toast.

Lord DAWSON, in proposing the Common Health, said that to-day in medicine the emphasis had shifted from the prevention of disease to the construction of health and he pointed out how much the work of the committees on nutrition and physical education set up by the Association had done to foster this outlook. The strain of modern life and unemployment had hindered our progress but the improved health of school-children showed what had been accomplished. Lord Dawson welcomed the announcement in the King's Speech that a large sum of money was to be set aside for the treatment of cancer but made a plea that with our falling birth-rate we should not relax our efforts to improve the quality of our youth. He suggested that six-month courses in citizenship should be held for those between 17 and 19, from which they would emerge strengthened in body and mind. Medicine should concentrate on constructive health and claim priority for it.

In reply Mr. WALTER ELLIOT said that as Minister of Health he welcomed the opportunity of speaking to the marching regiment of the profession. He went on to relate some of the emergency measures which had been taken during the crisis. A survey of hospital accommodation had been made, and valuable information had been gathered from over 3000 hospitals and institutions regarding existing and potential facilities for the treatment of casualties. He paid a tribute to the work of the Wilson committee, which had made clear and definite proposals for the organisation of the London hospitals in a time of crisis. When the international situation deteriorated in September the Ministry had been forced to concentrate on plans which could be carried out under the pressure of events, and it was estimated that had the occasion arisen 150,000 beds would have been available in institutions in England and Wales within 24 hours. Thirty-four of the larger London hospitals were to be evacuated and serve as casualty stations, and stretcher fittings for 300 Green Line buses were stored ready in the appropriate garages. It was hoped soon to hold regional conferences to discuss difficulties with hospitals all over the country. Mr. Elliot said that the military authorities had agreed not to mobilise all the military hospitals at the outset of any crisis, but even so emergencies in private practice would arise and he thought that once doctors had registered they should stand by and carry on with their ordinary work till called upon. In the meantime, he said, we must extend and improve our health services. He reminded his hearers that the rate of maternal deaths for last year was the lowest ever recorded and that legislation was to be introduced to provide a national cancer service, with modern facilities for diagnosis and treatment for the whole country. He felt that we had acquired much scientific knowledge and statistical information which we had not yet applied, and he appealed to the Association to help to put the dreams and plans of medicine to the touchstone of execution.

In proposing the toast of the Guests the CHAIRMAN asked who was he to judge holy men, but singled out several of the distinguished company for honourable mention. Sir JOHN ANDERSON spoke with gravity of the heavy responsibilities he had lately assumed as Minister of National Service, but since, as an exercise in coördination, he had that evening assigned the detailed discussion of the medical aspects of preparations for a national emergency to Mr. Elliot, Sir John contented himself with returning graceful thanks to the Association for their hospitality.

PARLIAMENTARY INTELLIGENCE

OPENING OF NEW SESSION

The King's Speech

THE new Session of Parliament was opened by His Majesty The King in State in the House of Lords on Nov. 8th. In the course of his Speech from the Throne, the King said: Although the equipment and expansion of my defence forces are now making rapid progress, the emergency through which we have passed has shown that certain deficiencies in our military and civil defence preparations remain to be remedied. My Ministers have reviewed these matters in the light of the experience gained, and will in due course take steps to accelerate and supplement the measures already in hand. The problems of civil defence, including that of the effective utilisation of the resources of the nation for national voluntary service, will in future receive the undivided attention of a Minister, the Lord Privy Seal. The active furtherance of peace in Europe, which is the constant aim of my Government, will, I trust, lead to a wider spirit of confidence and supply a fresh impulse for expansion in trade, industry, and employment.

My Government will press forward with better housing, both urban and rural, and will proceed with the development of the educational services. They will vigorously continue the campaign for the improvement of the public health, and in particular will submit to you proposals for the earlier and more effective treatment of cancer. The policy of my Government will continue to be directed to improving conditions in the Special Areas. A Bill will be laid before you to amend the penal law dealing in particular with young offenders and those who commit repeated offences. Measures will be laid before you to assist the production, improve the quality, and increase the consumption of milk.

Among the measures which you will be invited to pass will be a Bill to raise the amount of the Miners' Welfare Levy, in order to provide additional funds for the building of pithead baths. A Bill will be submitted to you for the purpose of reorganising Scottish administration and centralising the Government Departments in Edinburgh. Further action will be taken to deal with slums and overcrowding in Scotland, and a measure relating to the financial provision for this purpose will be submitted to you. You will also be invited to consider other Scottish measures, including a Bill for the amendment of the marriage law. Other legislative proposals will be laid before you and proceeded with as time and opportunity offer.

Debate on the Address

THE SOCIAL SERVICES

In the House of Commons on Nov. 8th, the motion for an address of thanks in reply to the King's Speech was moved by Mr. HELY-HUTCHINSON.

Mr. MARKHAM, who seconded, said he was glad to notice the reference to the Government's determination to eradicate cancer. This addition to the social services would be cordially welcomed in all parts of the House. The more effective treatment of cancer could not be carried out by the existing voluntary hospital system, and they would all like to see the most up-to-date methods, in coöperation with the local authorities, to set up adequate staffs and centres for the treatment of this great scourge. More than that, however, the great thing was to eliminate the ignorance, inertia, and fear which were the greatest allies of cancer in this country.

Mr. ATTLEE (Leader of the Labour Opposition) complained that there was no reference in the King's Speech to the social services. Nor was there any mention of unemployment. The Government were equally vague on the question of the Special Areas. Nothing was said about the condition of the people, nor in regard to old age pensions. The Labour Party considered that the foundation of the national strength was in the condition of the people, and that a sound policy of nutrition was a basis of strength. That could not be obtained through a means test. There was no reference in the King's Speech to that vital question of the strength of the nation. The Labour Party welcomed the proposals for the reform of the penal system, the proposals to deal with cancer, and those relating to pithead baths.

PRIME MINISTER'S REPLY

Mr. CHAMBERLAIN said that the Minister of Civilian Defence (the Lord Privy Seal) would give his prompt and undivided attention among other subjects to that of the evacuation of the civil population from certain places in times of emergency. The second point which would occupy the Minister's attention would be the provision of adequate shelter accommodation in vulnerable areas. On the subject of national voluntary service, a good deal of preliminary planning had been done for the mobilisation of the nation's man power for those services and the new Minister would accordingly find a considerable amount of material ready to his hand when he came to formulate his plans under that head. With regard to the social services, it was not to be expected that we could at one and the same time embark on the enormous armament programme, the whole cost of which we were not yet in a position to estimate, and face projects of social improvements which would lay on the taxpayers fresh and impossible burdens. There was no foundation for any suggestion that the Government were contemplating cuts in the existing social services. Nothing that had been said by any Minister gave any foundation for such an accusation, and, as the King's Speech showed, the Government were still making further extensions of the social services. The provisions for public health, housing, slum clearance, and dealing with overcrowding still went on vigorously. A new proposal, mentioned in the King's Speech, for making a frontal attack on that perhaps most frightening of all diseases, cancer, would, he knew, have the approval of all parts of the House. Mr. Attlee had mentioned nutrition and had spoken as though, because the word did not appear in the King's Speech, it must necessarily be absent from the minds of the Government. It had been in his (Mr. Chamberlain's) mind for many years since a conversation which he had, when he was Minister of Health, with the late Sir Walter Fletcher, who had said to him that by a comparatively small expenditure on teaching people how to feed themselves and their families, more could be done to improve the health and physique of the nation even than by the greater efforts which were then being made at the Ministry of Health to improve housing conditions. That statement was so striking that it made a very deep impression on his mind, and as a matter of fact the Minister of Health to-day was engaged on the most far-reaching and comprehensive inquiry into the food habits of the people that had ever been made in this or any other country. Everybody would agree that the more information they had about this subject the better, in order that when they did proceed they might be building on solid ground and be certain that they were proceeding on right lines.

Referring to agriculture, Mr. Chamberlain said that the most important measure of the Session, and one of the earliest to be introduced, would be the new Milk Bill. The main principle of the Bill was to encourage the consumption of liquid milk, alike in the interests of the farmer and of national health.

Sir A. SINCLAIR (Leader of the Liberal Party) said that the Prime Minister had not dealt very effectively with the important problem of nutrition. It was quite true that that great pioneer of medical research, Sir Walter Fletcher, took a keen interest in this subject many years ago, and interested a number of other people in it; and that, largely as a result of his inspiration, an enormous amount of work had been done on it since the time of which the Prime Minister had spoken. Among the most prominent workers in that field since then was, of course, Sir John Orr, and the potentialities of an effective policy of nutrition had been abundantly proved by his researches and those of other workers. The time had come when the House might expect from the Government a policy which would harmonise the interests of agricultural producers with those of the consumers who would benefit so greatly from the policy of nutrition.

The debate was adjourned.

AN ASSURANCE IN THE HOUSE OF LORDS

In the House of Lords on Nov. 8th, Lord STANHOPE, First Lord of the Admiralty, speaking in the debate on the Address in reply to the Gracious Speech from the Throne, gave an assurance that there was no intention on the part of the Government to curtail the social services of the country. He pointed out that in the Gracious Speech there was a reference to an effort which would be made to deal with cancer, a disease which had replaced tuberculosis as the greatest scourge afflicting mankind. Its seriousness, he said, could be gauged from the fact that according to his information cancer was responsible for no fewer than 200 deaths a day.

NOTES ON CURRENT TOPICS

Hospitals and A.R.P.

ON NOV. 3rd Mr. HERBERT MORRISON invited the House of Commons to express its grave concern at the admitted unpreparedness to protect the civil population when the country was brought to the brink of war. If things were bad in London, which quite properly received prime consideration on the whole, how much worse must they have been, he said, in other centres. It was preposterous to lay blame on local authorities which had only received statutory responsibility for air-raid precautions at the beginning of this year, and when no effective lead was given to them. To secure a million A.R.P. volunteers in ten months was a great achievement, but it could be bettered. He was sure this work could be done by voluntary effort, provided that the volunteers knew that both the State and the local authorities were efficient in the discharge of their duties. The organisation of hospitals locally and centrally should trace the movement of the patient from the time that he might be injured in the street to the first-aid centre through the casualty hospital to the base hospital. He begged the Government to make the administration of A.R.P. efficient so that they could put their hands on their hearts and say that here was a job being done well in a fine partnership between State, local authorities, and citizens.

Sir SAMUEL HOARE, Home Secretary, moving an amendment declaring approval of the Government's determination to complete with the utmost speed the necessary measures, said that no Government had ever been faced with problems so vast as those of A.R.P., many of them running directly counter to the general trend of developments in the national life. He agreed with Mr. Morrison that by a united effort they could make as good a system of passive defence as any in the world.

Mr. R. C. MORRISON complained that during the crisis the Ministry of Health was not particularly helpful. The local hospitals had no advice or information at all. The voluntary hospital in his constituency (Tottenham) was unable to inform the local authority whether it was to be regarded as a base hospital in connexion with air-raid precautions. The Home Office had said repeatedly that gas-proof rooms were essential. In the middle of the crisis they informed the local authorities that a booklet would be distributed to every house in the United Kingdom and the principal part of that booklet was occupied with informing householders how to gas-proof rooms. On the very day that booklet was distributed a conference was held at the Ministry of Health and instructions were given to representatives of voluntary hospitals. One of the instructions was: "As regards gas-proofing, gas is no longer considered to be a major risk, and it is not thought that any special precautions should be taken."

Colonel NATHAN said that as chairman of the Infants Hospital in Vincent-square and of the Air Raid Precautions Committee of Westminster Hospital, both within the danger area, he had for months made efforts to obtain directions about what the hospitals were expected to do with regard to their patients, staffs, and buildings, and their functions in case of air raids in dealing with casualties, as well as where the expense would fall. To none of these inquiries was any answer forthcoming. At the climax of the crisis a meeting of representatives of the great teaching hospitals was called at the Ministry of Health and learned that the hospitals emergency service had just been created. Colonel Hebb, director-general of this emergency system, assisted in the London area by Dr. Dobbie of the L.C.C., gave unstinted and devoted service. The statement made at this meeting was: "Gentlemen, You must expect bombs to fall on London at any moment. Do the best you can." The two hospitals of which he had spoken went ahead, and within a week were ready to take emergency cases to an extent greater by 50 per cent. than their ordinary accommodation. They had difficulties. The Home Office, for instance, was unable to provide sufficient gas masks, both for patients and staffs. He thought Mr. R. C. Morrison was wrong in attributing to the Government the view that gas protection in hospitals was unnecessary. It was recognised that in a hospital with constant traffic of patients in and out it was impracticable to have complete gas protection. They were advised that special accommodation and gas-proof rooms should be made for cardiac and other chest cases and for the protection of food. There was the question how the casualties were to be directed to the various hospitals. It was essential, he thought, for the first-aid stations and the hospitals to be under the same central direction and administration. It had so far been arranged that there should be no medical officer attached to first-aid stations, but it would be impracticable for the hospitals to cope with the inrush of casualties unless they had first been sorted out by some responsible person.

The amendment was carried by 355 votes to 130.

QUESTION TIME

WEDNESDAY, NOV. 2ND

National Parks

Mr. MANDER asked the Minister of Health if he was now able to state the policy of the Government on the subject of national parks.—Mr. BERNAYS, Parliamentary Secretary to the Ministry of Health, replied: My right hon. friend is giving careful consideration to the recommendations on the control of development generally and particularly in areas including the sea coast much frequented by the public during holidays which have been made to him by his advisory committee when they reported recently on the preservation of the countryside.

Mr. ROBERTS: Can we have any indication when a decision may be arrived at?—Mr. BERNAYS: No Sir.

Clothing for Physical Exercises

Mr. TOMLINSON asked the Parliamentary Secretary to the Board of Education if he was aware that the grant of only 20 per cent. in aid of the clothing equipment for physical exercises of children in public elementary schools was causing grave dissatisfaction amongst local education authorities; and, in view of the Government's general financial policy in respect of physical fitness, would he take steps for all approved expenditure on such clothing equipment to be recognised for at least a 50 per cent. grant in aid.—Mr. KENNETH LINDSAY replied: Representations to this effect have been made to the Board and have been very carefully considered in consultation with the Treasury. I regret that it is not practicable to make the suggested alteration at a time when the adjustment and equalisation of the various factors in the elementary grant formula are under discussion between representatives of the local education authorities and officers of the Board.

THURSDAY, NOV. 3RD

Miners' Nystagmus and Workmen's Compensation

Miss WARD asked the Home Secretary what action had been taken by his department, in view of the fact that the Secretary for Mines had implemented the recommendations contained in the report on workmen's compensation relating to miners' nystagmus so far as his department was concerned.—Sir SAMUEL HOARE replied: The recommendations affecting my department cannot be implemented without legislation. I understand that they have been discussed among representatives of employers and workpeople in the industry and I am asking both sides to let me have their considered views on the question of legislating to give effect to the committee's proposals.

Childbirth in Prison

Mr. MCENTEE asked the Home Secretary if he had considered the representations from the Magistrates Association asking that women and girl prisoners who were about to become mothers should be transferred to hospital outside the prisons for their confinements; and what action he proposed to take in the matter.—Sir SAMUEL HOARE replied: This suggestion would involve an amendment of the existing law. I am considering the matter in connexion with the Bill which I propose to introduce next session.

Contraceptives in Slot Machines

Mr. FLEMING asked the Home Secretary whether he was aware that contraceptive appliances might be obtained from a slot machine, labelled Veribest Cigarettes, placed outside a shop doorway in Manchester; and whether any steps would be taken to make such sales illegal.—Sir SAMUEL HOARE replied: My attention has been drawn to this matter. As regards proposals for legislation I would refer my hon. friend to the reply which the Prime Minister gave last April:—

[Mr. CROWDER asked the Prime Minister whether arrangements could be made to provide special facilities for the passage of the Contraceptives (Regulation) Bill.—Mr. CHAMBERLAIN replied: In view of the state of Parliamentary business, I can hold out no hope of special facilities being given for the discussion of this Bill.]

Mr. FLEMING: Is my right hon. friend aware that in Manchester this particular type of machine is being used by children of 14 and 15 years of age; and in these circumstances does he not think it advisable to call for a report from the chief constable on the matter?—Sir S. HOARE: I will certainly consider that suggestion.

Lieut.-Commander AGNEW: Does not my right hon.

friend think that the time has come when the Government should introduce legislation as soon as possible ?

Accident at an Ice-cream Factory

Mr GEORGE STRAUSS asked the Home Secretary whether H.M. factory inspectors had now completed their report of the serious accident that occurred in the Eldorado Ice Cream Factory, Lambeth ; and what action was being taken to prevent the recurrence of such an accident and consequent loss of life.—Sir SAMUEL HOARE replied : This matter was very fully investigated by the Factory Department and the works will be further visited to see that the further precautions contemplated are being carried out. These consist in the main of extensive alterations of the plant designed to obviate the risk of a similar occurrence in future, and as additional precautions the firm are arranging for the staff to be trained in fire drill and for other improvements in the arrangement for evacuating workrooms in the event of an emergency.

Undulant Fever

Mr. LIDDALL asked the Minister of Health what was the number of human cases of undulant fever arising in Great Britain attributable to bovine infection through milk or meat in each of the past ten years ; and what measures he had taken to reduce the risk of human infection by the group of Brucella organisms.—Mr. ELLIOT replied : Undulant fever is not a generally notifiable disease and statistics of its incidence are therefore not available. Estimates have, however, been made by responsible investigators that there may be some 400 or 500 cases per annum in this country. The importance of all measures to ensure the cleanliness and safety of milk in order to avoid risk from this and other milk-borne diseases has frequently been emphasised by my department. Considerable progress in this matter has been made. I have no information to suggest that meat is a source of human infection with this disease.

Brucella-infected Cows

Mr. LIDDALL asked the Minister of Agriculture what proportion of tested milch cows in Great Britain showed evidence of brucella infection as manifested by agglutination blood tests ; and what measures he had taken to allay the anxiety felt by certain local authorities at the failure of his department materially to help in investigating this disease in animals and in preventing the sale and distribution of milk from farms in which brucella-infected cows were believed to exist.—Mr. MORRISON replied : No statistics are available as to the proportion of milch cows submitted to the agglutination test which react, but the general view is that about 40 per cent. of dairy cows are infected. Where at a routine clinical inspection of a dairy herd, or at a special inspection made following a report from a local authority that suspicion attaches to certain milk, a milch cow is found by a veterinary inspector showing clinical signs of the disease, the sale of the milk of such animal is prohibited by Section 5 of the Milk and Dairies (Consolidation) Act, 1915. For the last few years the problem of contagious abortion in cattle has been under investigation at a number of institutions under the ægis of a Committee of the Agricultural Research Council appointed in consultation with the Medical Research Council.

Asbestosis

Mr. KELLY asked the Home Secretary the number of cases of asbestosis reported during the last 12 months.—Sir SAMUEL HOARE replied : During the twelve months ended Oct. 31st last twelve cases of disablement or suspension were certified by the medical board. In addition 14 deaths came to the notice of the department including several cases previously certified during life.

MEDICAL NEWS

University of Cambridge

On Nov. 4th the following degrees were conferred :—

M.A.—G. D. Channell and F. W. Smith.
M.D.—Leslie Foulds, D. W. C. Gawne, and Gwyn Rocyn-Jones.
M.B., B.Chir.—*T. J. Fairbank, *G. H. Baines, *T. L. Barbour, *R. I. C. Bradford, and H. W. Adeney.
M.B.—* Garthowen Williams.

* By proxy.

Prof. K. Linderstrom-Lang of the Carlsberg Institute, Copenhagen, will deliver a lecture on studies in enzymatic histochemistry at 5 P.M. on Wednesday, Nov. 16th, in the biochemical laboratory lecture-room.

Dr. A. M. Barrett, Sir Halley Stewart research fellow in hæmatology at the London Hospital, has been appointed university demonstrator in pathology for three years.

Royal College of Physicians of London

Dr. Morley Fletcher will represent the college at the opening of the Royal Australasian College of Physicians at Sydney in December. He will present on their behalf to the new college an illuminated address and a replica of their silver wand or caduceus given by Caius in 1556.

University of Liverpool

Dr. C. V. Harrison, first assistant in morbid anatomy at the British Postgraduate Medical School, has been appointed senior lecturer in pathology in the university in succession to Dr. T. F. Hewer, who has been appointed to the chair of pathology in the University of Bristol.

Royal College of Physicians of Edinburgh

At a meeting of the college held on Nov. 1st, with Dr. Alexander Goodall, the president, in the chair, Dr. Frederick George Gibbs (Edinburgh) was formally admitted to the fellowship. Dr. Ernest Chalmers Fahmy (Edinburgh), Dr. Morris Witkin (Johannesburg), Dr. Thomas Draper (Karachi, India), Dr. Ian Dalgleish Easton (Edinburgh), and Dr. James Gilbert Murdoch Hamilton (Edinburgh) were elected to the fellowship.

The Hill Pattison-Struthers bursary in anatomy and physiology was awarded to Mr. Sidney Spector.

Royal College of Surgeons of Edinburgh

On Nov. 1st the following candidates who have passed their examinations were awarded licences in dental surgery :—

W. A. Barton, May A. Brookhouse, J. C. Brown, N. A. Burnett, A. J. Cowen, J. G. Cross, F. H. Duvall, P. L. Khurana, Muriel I. Mackay, J. A. MacLean, W. S. Matheson, R. A. Morrison, Lionel Ordman, John Wallace, J. P. Watters, and Dorothy A. Young.

Royal Faculty of Physicians and Surgeons of Glasgow

At the annual meeting of the faculty the following were elected office-bearers for the coming year : president, Dr. John Henderson ; visitor, Dr. J. Souttar McKendrick ; hon. treasurer, Dr. James H. MacDonald ; hon. librarian, Dr. W. R. Snodgrass ; representative to the General Medical Council, Mr. G. H. Edington ; other councillors, Mr. J. Douglas Brownlie, Dr. Carstairs C. Douglas, Mr. Donald Duff, Mr. A. G. Faulds, Mr. A. J. Hutton, Dr. A. Brown Kelly, Dr. H. L. G. Leask, Mr. William J. Richard, Mr. Archibald Young, and Mr. Roy F. Young.

Scottish Conjoint Board

On Oct. 29th the following candidates, having passed their examinations, became licentiates of the Royal Colleges of Physicians and of Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow :—

C. G. Adams, A. C. B. Allan, M. Y. Anthony, S. A. Antonious, R. E. G. Armattoe, S. N. Banerji, G. A. Bell, J. A. Brown, R. A. Brown, Prabhuram Chatterjee, Benjamin Crawshaw, Sidney Edelson, Frieda Ehrlich, W. V. A. Erskine, A. F. A. Fairweather, N. L. Freund, R. S. Friedlander, B. M. Heller, Kate Hermann, Barney Hirschson, F. J. Hoenigsberger, R. B. Hollos, J. K. Houston, T. S. Hsu, G. S. Kambourian, Franz Kreuter, William Lubansky, J. C. McGrath, J. L. Markson, S. B. A. Mattar, Karl Meyerhof, Emanuel Mintz, Solomon Mirk, A. G. Mohammed, Wolfe Morron, R. D. Oliver, Semjon Oshinsky, Gabriel Pickar, Bruno Pribram, I. B. Radow, David Raeside, Paul Rosenbaum, Joseph Schlosser, J. M. Silverstein, David Simenoff, Reuben Sorkin, Marie H. Stevenson, E. S. Sutherland, Albert Shapiro, Adrian Taterka, John Tolland, Abdul Waheed, and B. J. S. Wessels.

Royal Society

The Davy medal of this society has been awarded to Prof. G. Barger, F.R.S., in recognition of his researches on alkaloids and other natural products.

Westminster Hospital

This hospital has received a donation of £1000 which is to be used to equip a research laboratory in the new medical school in memory of the late Percival M. Watts.

Fellowship in Child Psychology

Applications are invited for the Sir Alfred Fripp fellowship, which is of the value of £300 per annum and is tenable for two years in the children's department of Guy's Hospital. The fellowship was founded to promote the advancement of knowledge and research in psychology, more particularly through the study of children in health and/or disease. Further information may be had from the dean of Guy's Hospital medical school, S.E.1.

Congress on Brucellar Infections

The federation of medical societies of North Africa are holding a congress at Oran on April 3rd, 4th, and 5th under the presidency of Dr. Jasseron. Eight discussions will be held, each dealing with an aspect of the problem of brucellar infections in North Africa. Further information may be had from the secretary-general of the congress, Dr. René Solal, 16, Boulevard Joffre, Oran, Algeria.

The Family To-day and To-morrow

Under this title the Church Union Association of Church Social Action is holding an exhibition at the Caxton Hall, Westminster, from Nov. 14th to 17th. The work of various Christian societies which are concerned with aspects of family life will be demonstrated. The speakers will include Miss Eleanor Rathbone, M.P., on family allowances, and Mr. F. J. McCann, F.R.C.S., on the falling birth-rate.

Royal Eye Hospital

At a meeting of the Clinical Society of the Royal Eye Hospital on Nov. 2nd, Mr. L. Vernon Cargill drew attention to developments which have lately taken place in the departments of pathology and research. A new and highly efficient animal house has been installed, and already an investigation is being conducted into the retinal changes found in rabbits in septic poisoning. In the hospital museum the specimens have been completely re-catalogued and arranged according to the lesions demonstrated. For the benefit of examinees representative specimens are starred in the catalogue and provided with labels of distinctive colour. By this means a D.O.M.S. candidate can cover the whole field of ophthalmic pathology in the last few hectic days before his ordeal. In the out-patient department there is now a comprehensive collection of slides of all the commoner ophthalmic conditions, so that ophthalmoscopic and microscopic appearances of cases can easily be correlated. Mr. Cargill demonstrated some of the pathological specimens to the meeting and then called on Mr. R. H. Rushton to explain his new method for the clinical measurement of the axial length of the eye. This method involves no surgical interference, but depends on the fact that the dark-adapted retina is sensitive to X rays. Mr. Rushton uses an instrument by which a beam of X rays can be moved forward until it impinges on the posterior pole of the eye, when it can be recognised entoptically by the patient. The position of the cornea is then registered, and simple measurement gives the axial length of the eye. The method should have important applications in practical ophthalmology, for instance, in the correlation of the axial length with the refraction in myopia. Mr. E. J. Somerset then read a paper on the significance of errors of refraction in chronic blepharitis in children, based on the careful refraction under atropine of 300 cases. He found much the same incidence of refractive errors in these cases as in normal samples of the population. They show no increase either of spherical or astigmatic errors, and cases of monocular blepharitis do not show any greater incidence of blepharitis in the eye with the greater error of refraction. Causes other than errors of refraction must therefore be sought for this condition. Mr. Somerset pointed out that his findings controverted many of the statements which have presumably been copied from one ophthalmic text-book to another.

Medico-Chirurgical Society of Edinburgh

At a meeting of this society on Nov. 2nd the following office-bearers were elected: vice-president, Prof. R. W. Johnstone; councillors, Dr. A. F. Wilkie Millar, Dr. E. H. Cameron, Dr. G. H. Percival, and Dr. C. E. Scott; treasurer, Mr. W. W. Carlow; secretaries, Dr. T. R. R. Todd and Mr. Walter Mercer; and editor of transactions, Dr. J. D. Comrie.

Sir Frederick Hobday Presentation Fund

We are informed that this fund has now reached its first £1000, contributed by about 850 subscribers. The committee has decided to continue its work in order to obtain the amount necessary for the object which Sir Frederick Hobday has in view—namely, the endowment of a chair of comparative medicine. Subscriptions should be sent to the hon. secretary, Mr. E. T. Cox, at 3, St. John's-avenue, London, S.W.15.

Medical Tour to the Mediterranean

The Société médicale du Littoral Méditerranéen has once more arranged a tour this year. It will take place from Dec. 26th to Jan. 1st, and visits will be paid to Cannes, Le Cannet, Juan les Pins, Antibes, Golfe Juan, Grasse, Vence, Cagnes, Monte Carlo, Beaulieu, and Nice. There will also be additional excursions for those who wish to join them to the Alps and Corsica. Further information may be had from the Federation of the Health Resorts of France, B.M.A. House, Tavistock-square, London, W.C.

Milk in the Holidays

During the summer holidays the London County Council again arranged, as they did at Easter, for a distribution of milk to those school-children who receive it on doctors' orders in term-time and whose parents wished it to be continued. The use of schools as distributing centres was avoided as far as possible because many schoolkeepers are away and the schools are cleaned and repainted at that season. Distributions were made at 160 centres—78 in parks and open spaces controlled by the L.C.C. and metropolitan borough councils, 3 in the Royal Parks, 1 at Coram's Fields, 77 at schools, and 1 in a hired hall. On the whole the arrangements worked well. The average daily attendance of free cases was 17,419, compared with 20,831 at Easter, and of paying cases 7382 compared with 6995. The highest attendance was on the second day, and thereafter the figure declined almost steadily every day. The attendance of free cases must be considered disappointing, but the Council propose to repeat the distribution at Christmas.

Surgical Instrument Manufacturers' Association Dinner

The annual dinner of the Surgical Instrument Manufacturers' Association was held at the Holborn Restaurant on Oct. 28th. In proposing the toast of the association, Prof. R. E. Kelly congratulated that body on the high ethical standards which they had set themselves. Surgical instrument making, he said, is probably the oldest craft in existence. At the Royal College of Surgeons there were skulls from Peru that have come down to us from the Stone Age, with holes which were apparently made by flint or stone implements, probably to let out evil spirits or to let in good ones. The fact remained that craniotomy was done in the Stone Age and the patients recovered from the operation. In the more recent time of Hippocrates trephine knives, bone drills, probes, needles, toothed forceps, bone elevators, and craniotomy forceps were all in use. Many so-called new inventions are really a good deal older than we think, and it was interesting to find from the museums and the older text-books that many things that were used long ago are being re-invented to-day. In reply, Mr. H. Guy Drew, who presided, said that the particular problem of every surgical instrument maker was to know the exact conditions under which his instruments were to be used, and it was essential that there should be an intimate contact between the manufacturer's technical staff and the surgeon. There was a growing tendency among municipal and other committees to interpose between the surgeon and the surgical instrument maker someone whose sole job was to buy instruments, and he pleaded that there should be no interference between the surgeon and the actual surgical technician.

Deputation on Coördination of Medical Services

A deputation from the central emergency committee of the British Medical Association, including representatives of the Royal Colleges, was received on Nov. 8th by Sir Thomas Inskip, the Minister for Coördination of Defence, who was accompanied by officials of the government departments concerned. The deputation urged the establishment of machinery for the coördination of all medical services for the civilian population under a single body and the coördination of the civilian medical organisation with that of the Service Departments. They also proposed that this machinery of coördination should be closely associated with the central emergency committee as being representative of all branches of the profession.

In reply, the Minister said he greatly appreciated the assistance given by the Association, especially in compiling an exhaustive survey of the profession. He expressed himself in sympathy with the principles put forward, and undertook that they would be examined by the departments concerned. He assured the deputation of his desire to coöperate fully with the profession and to avail himself of their services.

The members of the deputation were Sir Kaye Le Fleming, Dr. H. G. Dain, Mr. Bishop Harman, Sir Alfred Webb-Johnson, Dr. A. E. Clark Kennedy, Prof. R. M. F. Picken, Sir Charles Wilson, Dr. Letitia Fairfield, Dr. G. C. Anderson and Dr. Charles Hill.

Medical Diary

Nov. 14th to Nov. 19th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY.

History of Medicine: Odontology. 8.30 P.M., Sir Frank Colyer: Old Instruments for the Extraction of Teeth. (C. E. Wallis lecture.)

TUESDAY.

General Meeting of Fellows. 5.30 P.M.

Pathology. 8 P.M. (Westminster Hospital, Horseferry-road, S.W.), R. M. Haines: (1) Periarteritis Nodosa. (2) Congenital Syphilis. N. F. Maclagan: (3) Blood and Urine Urea Estimations. (4) Fæcal Fat Estimation. (5) A Modified Galactose Tolerance Test. (6) Serum Phosphatase in Cases of Bone Tumour. (7) Steatorrhœa Treated with Special Yeast Extract (Verzar). E. Geal: (8) Staphylococcal Toxin. J. Humble and Court: (9) Diseases of Calvarium. R. J. V. Pulvertaft: (10) Sterilisation of Air and Surfaces. R. G. Waller: (11) Myxosarcoma of Muscle.

WEDNESDAY.

Surgery. 8.30 P.M., Prof. Hans Finsterer (Vienna): Ulcus Cancer of the Stomach.

THURSDAY.

Dermatology. 5 P.M. (cases at 4 P.M.). Dr. J. H. Sheldon: (1) Sjögrens's Syndrome. Dr. G. B. Dowling and Dr. W. Freudenthal: (2–3) Symmetrical Scleroderma with Sclerodactylia. Dr. H. W. Barber: (4) Multiple Epithelioma-tosis due to Arsenic. (5) Pustular Psoriasis. Mr. H. Corsi: (6–8) Lentigo Malignum (Hutchison). Dr. John Franklin: (9) Pachyonychia Congenita.

Neurology. 8.30 P.M. (cases at 8 P.M. at the Maida Vale Hospital for Nervous Diseases, W.), Dr. Anthony Feiling: (1) Simmonds's Disease. (2) Intramedullary Tumour with Extreme Scoliosis. Dr. Douglas McAlpine: (3) Pineal Tumour. (4) Chronic External Hydrocephalus. Dr. W. J. Wyllie: (5) Meningitis Serosa Circumscripta Spinalis. (6) Toxic Hydrocephalus. (7) Scalenus Anticus Syndrome Simulating Cervical Rib. Mr. A. Dickson Wright: (8) Meningioma of Occipital Lobe. (9) Hernia Cerebri. Dr. Redvers Ironside: (10) Trigeminal Neuralgia treated by Sjögvist's Operation (Mr. Harvey Jackson). Mr. Wylie McKissock: (11) Parasagittal Meningioma of Pre-natal Origin. Dr. R. G. M. Longridge (for Dr. McAlpine): (12) Alzheimer's Disease.

FRIDAY.

Physical Medicine. 4.30 P.M., Dr. H. Crichton-Miller: Psychological Factors in Physiotherapy. Dr. R. G. Gordon will also speak.

Obstetrics and Gynæcology. 8 P.M. Dr. J. Preston Maxwell: Adult and Fœtal Rickets in China with Notes on a Special Form of Cataract. Mr. J. St. George Wilson: The Liverpool Quadruplets. (Film.)

Radiology. 8.30 P.M., Major H. E. P. Yorke: Radiology in War-time. (This meeting will be held in camera.)

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.

THURSDAY.—8.15 P.M. (Hospital for Tropical Diseases, W.C.), clinical and laboratory meeting.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.

MONDAY.—8.30 P.M., Mr. Douglas MacLeod, Dr. P. M. F. Bishop, and Mr. W. R. Winterton: Hormone Therapy in Gynæcological Conditions.

CHELSEA CLINICAL SOCIETY.

TUESDAY.—8.30 P.M. (Hotel Rembrandt, Thurloe-place, S.W.), Mr. J. E. H. Roberts: Modern Surgery of the Chest.

NORTH LONDON MEDICAL AND CHIRURGICAL SOCIETY.

WEDNESDAY.—9 P.M. (Royal Northern Hospital, N.), medical clinical meeting.

SOCIETY OF RADIOTHERAPISTS OF GREAT BRITAIN AND IRELAND.

FRIDAY.—5 P.M. (11 Chandos-street, W.), short papers.

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck-street, W.

THURSDAY.—8 P.M., Mr. J. Clarkson: "Quality" of High Voltage Radiations in Tissues. Mr. W. V. Mayneord, D.Sc.: demonstration of apparatus.

Medical Section.

FRIDAY.—5.30 P.M., demonstration of the Newton X Ray Film Projector.

EUGENICS SOCIETY.

TUESDAY.—5.15 P.M. (rooms of the Royal Society, Burlington House, Piccadilly, W.), Prof. C. Spearman, F.R.S.: Intelligence Tests.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.

THURSDAY.—5 P.M.; Prof. J. B. S. Haldane, F.R.S.: Some Problems of Human Congenital Disease. (Lloyd Roberts lecture).

UNIVERSITY OF LONDON.

TUESDAY, WEDNESDAY, and THURSDAY.—5.30 P.M. (London School of Hygiene, Keppel-street, W.C.), Dr. H. Lyndhurst Duke: The Pathogenic Trypanosomes of Africa and the Tsetse Flies (Glossina) that Convey Them.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.

TUESDAY.—4.30 P.M., Prof. E. Mapother: Medical Psychology.

WEDNESDAY.—Noon, clinical and pathological conference (medical). 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Prof. H. W. Florey: The Mucous Secretion of the Gastro-intestinal Canal.

THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration.

FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Mr. R. Ogier Ward: Diseases of the Bladder.

Daily 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

NATIONAL HOSPITAL, Queen-square, W.C.

MONDAY.—3.30 P.M., Dr. E. A. Carmichael: The Sympathetic Nervous Ssystem.

TUESDAY.—3.30 P.M., Dr. J. St. C. Elkington: Epilepsy.

WEDNESDAY.—3.30 P.M., Dr. F. M. R. Walshe: clinical demonstration.

THURSDAY.—3.30. P.M., Dr. George Riddoch: The Sensory System.

FRIDAY.—3.30 P.M., Dr. Carmichael: The Sympathetic Nervous System.

Out-patient clinical daily at 2 P.M.

ST. GEORGE'S HOSPITAL, S.W.

THURSDAY.—5 P.M., Dr. Alfred Meyer: psychiatric demonstration.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY.—2 P.M., Mr. Eric Lloyd: Diseases of the Hip-joint in Children. 3 P.M., Dr. R. T. Brain: Urticaria.

Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.

FRIDAY.—4 P.M., Mr. C. Gill-Carey: Rhinological Aspects of Asthma.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL, N.W.

WEDNESDAY.—4 P.M., films by courtesy of Messrs. Bayer Products. (1) Œdema, Cardiac and Renal. (2) Olympic Games.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.

FRIDAY.—3.30 P.M., Mr. L. C. Attkins, D.Sc.: Oral Sepsis in the Rheumatic Diseases.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.

TUESDAY.—5 P.M., Dr. W. N. Goldsmith: Infantile Eczema and Papular Urticaria.

WEDNESDAY.—5 P.M., Dr. I. Muende: Histopathology of New Growths of the Skin. (Chesterfield lectures.)

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY to SATURDAY.—ROYAL WATERLOO HOSPITAL, Waterloo-road, S.E., all-day course in medicine, surgery, and gynæcology.—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C., afternoon course in dermatology. (Open to non-members.)—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W. 8 P.M., Tues. and Thurs., clinical and pathological M.R.C.P. course.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION.

TUESDAY.—4 P.M. (St. James' Hospital, Ouseley-road, S.W.), Mr. T. W. Letchworth: ophthalmic cases.

UNIVERSITY OF SHEFFIELD.
FRIDAY.—3 P.M. (Royal Hospital), Prof. J. Edington: Laboratory Diagnosis. 3 P.M. (Jessop Hospital for Women) Prof. J. Chisholm: lecture-demonstration on obstetrics and gynæcology.

LEEDS GENERAL INFIRMARY.
TUESDAY.—3.30 P.M., Mr. B. L. Jeaffreson: Common Gynæcological Conditions.

LEEDS PUBLIC DISPENSARY.
WEDNESDAY.—4 P.M., Mr. L. N. Pyrah: Common Urological Disorders.

MANCHESTER ROYAL INFIRMARY.
TUESDAY.—4.15 P.M., Dr. E. Bosdin Leech: Early Medicine and Quackery in Lancashire. (Lloyd Roberts lecture.)
FRIDAY.—4.15 P.M., Mr. John Morley: surgical cases.

ANCOATS HOSPITAL, Manchester.
THURSDAY.—4.15 P.M., Dr. G. J. Langley, Dr. K. V. Bailey, and Mr. F. H. Diggle: demonstration of case.

EDINBURGH ROYAL INFIRMARY.
THURSDAY.—5 P.M., Prof. J. W. McNee: Hepatitis. (Honyman Gillespie lecture.)

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY.—4.15 P.M. (Royal Infirmary), Prof. J. A. G. Burton: surgical cases.

Vacancies

For further information refer to the advertisement columns

Army Dental Corps.—Dental Surgeons.
Bangor, Caernarvonshire and Anglesey Infirmary.—Jun. H.S., £120.
Barrow-in-Furness County Borough—M.O.H. and Part M.O., £900.
Birkenhead, Clatterbridge Isolation Hosp.—Res. Asst. M.O., £200.
Birmingham and Midland Hosp. for Women.—H.S., at rate of £100.
Birmingham City.—Asst. M.O.H., £600.
Birmingham General Hosp.—Res. Surg. Reg., £100–£120.
Bolton Royal Infirmary.—Res. M.O., £250. Asst. Res. M.O., £200. Also three H.S.'s, each £150.
Boston General Hosp.—Res. M.O., at rate of £150.
Brighton Royal, Sussex County Hosp.—Hon. Med. Reg. H.P. and H.S., each £150. Also Cas. H.S., at rate of £120.
British Hosp. for Functional, &c., Disorders, 72, Camden-road, N.W.—Hon. Phys.
Cardiff, Glan Ely Tuberculosis Hosp., Fairwater.—Sen. M.O., £500.
Cheltenham General and Eye Hosps.—H.S., £150.
Chesterfield and North Derbyshire Royal Hosp.—H.S., and H.S. to Ophth. and Ear, Nose, and Throat Depts., each at rate of £150.
Chichester, Royal West Sussex Hosp.—Hon. Ophth. Surg.
Connaught Hosp., E.—Hon. Dermatologist.
Durham, Richard Murray Hosp., Blackhill.—H.S., £200.
Evelina Hosp. for Sick Children, Southwark, S.E.—H.S., at rate of £120.
General Lying-in Hosp., York-road, S.E.—Jun. Res. M.O. and Anæsthetist, at rate of £100.
General Post Office.—M.O., £500.
Glasgow Royal Hosp. for Sick Children.—Visiting Surgeon, £500.
Hampstead General and North-West London Hosp., Haverstock Hill, N.W.—Cas. Surg. O., at rate of £100. Also Ophth. Surgeon to Out-patients.
Hertford, Ware Park Sanatorium.—Asst. M.O., £300.
Hertford County Hosp.—H.S., at rate of £200.
Hosp. for Sick Children, Great Ormond-street, W.C.—Morbid Anatomist and Sebag-Montefiore Research Fellow, £600. Res. Surg. O. and Res. Anæsthetic Reg., at rate of £200 and £100 respectively. Two Res. H.P.'s and Res. H.S., each at rate of £50. Also Res. M.O. for Country Branch, at rate of £250.
Hosp. for Women, Soho-square, W.—Res. M.O., at rate of £100.
Huddersfield County Borough.—Asst. M.O.H., £500.
Infants Hosp., Vincent-square, Westminster, S.W.—Hon. Clin. Assts. Also H.P., at rate of £100.
Isleworth, West Middlesex County Hosp.—Additional Visiting Ophth. Surgeon, 3 guineas per session.
Lambeth Metropolitan Borough.—Deputy M.O.H., £840.
Lancashire Mental Hosps. Board.—Dental Surgeon, £500.
Leicester City Isolation Hosp. and Sanatorium, Groby-road.—Res. M.O., at rate of £300.
London Chest Hosp., Victoria Park, E.—Res. M.O., £350. Also H.P. and H.S., each at rate of £100.
London Homœopathic Hosp., Gt. Ormond-street, W.C.—Hon. Asst. Phys. Also H.P., H.S., and Gynæcological H.S., each at rate of £100.
London Hosp., E.—Surg. First Asst. and Reg., £300. First Asst. and Reg. to Neurological Dept. Also Hon. Asst. Ophth. Surgeon.
London Lock Hosp., 283, Harrow-road, W.—Two Surg. Registrars, each £100.
Maida Vale Hosp. for Nervous Diseases.—Med. Regs., £100.
Maidstone, Kent County Ophthalmic and Aural Hosp.—H.S. to Ear, Nose, and Throat Dept., at rate of £200.
Manchester Royal Children's Hosp., Pendlebury.—Res. M.O., at rate of £150.
Middlesbrough Education Committee.—Sen. Asst. School M.O., £700.
Middlesex Hosp. and Medical School, W.—Med. Reg., Otological Reg., and Fracture, &c., Reg., each £300.
Miller General Hosp., Greenwich-road, S.E.—Res. Surg. O., &c., £250. Two Cas. O.'s and Out-patient O., each at rate of £150. Also H.P. and H.S., each at rate of £100.
Nottingham City Hosp.—Res. Asst. M.O., at rate of £250.
Oxford County and City Mental Hosp., Littlemore—Jun. Asst. M.O., £350.
Oxford, Warneford Hosp. for Mental Disorders.—Asst. M.O., £350.
Paddington Green Children's Hosp., W.—Hon. Phys. to Skin Dept.
Portsmouth, Saint Mary's Hosp.—Jun. Asst. Res. M.O., £250.
Portsmouth Royal Hosp.—Sen. H.S., at rate of £175. Also Cas. O., at rate of £130.
Prince of Wales's General Hosp., N.—Hon. Clin. Assts. to Various Depts.
Princess Beatrice Hosp., Earl's Court, S.W.—Hon. Anæsthetist.
Princess Elizabeth of York Hosp. for Children, Shadwell, E.—Res. M.O., £200. Also Out-patient M.O. and H.S., at rate of £175 and £125 respectively.
Queen's Hosp. for Children, Hackney-road, E.—Ear, Nose, and Throat Surgeon.
Redhill County Hosp., Edgware.—Res. Jun. Asst. M.O., at rate of £250.
Rowley Regis Borough Council.—Asst. M.O.H. and Asst. School M.O., £500.
Royal Air Force.—Commissions.
Royal Cancer Hosp., Fulham-road, S.W.—Asst. Pathologist and Radiologist, each £500. Res. H.S. and two H.S.'s, each at rate of £100. Also Surgeon.
Royal Free Hosp., Gray's Inn-road, W.C.—In-patient Obstet. Assistant, Registrar to Ear, Nose, and Throat Dept., Fourth H.S., Surgeon and Med. Registrars, each £200. Dist. Obstet. Asst., at rate of £100. Res. Cas. O., at rate of £150. Also Anæsthetic Registrar and Gynæcological Registrar, each £100.
Royal Naval Dental Service.—Dental Officers.
Royal Naval Medical Service.—M.O.'s.
Royal Waterloo Hosp. for Children and Women, Waterloo-road, S.E.—H.S., at rate of £100.
St. John's Hosp. for Diseases of Skin, Leicester-square, W.C.—Hon. Asst. Phys.
St. John's Hosp., Lewisham, S.E.—Orthopædic Reg., 35 guineas.
Salvation Army, Mothers' Hosp., Clapton, E.—Sen. Res., M.O., £150. Also Jun. Res. M.O., at rate of £80.
Samaritan Free Hosp. for Women, Marylebone-road, N.W.—Anæsthetist.
Shoreham-by-Sea, Southlands Hosp.—Asst. Res. M.O., £300.
Surrey County Council.—Asst. M.O.'s, £600.
Todmorden Borough.—M.O.H. and School M.O., &c., £800.
Truro, Royal Cornwall Infirmary.—H.S., £170.
University College Hosp., Gower-street, W.C.—Med. Reg., £150.
University of London.—Geoffrey E. Duveen Travelling Studentship, £450.
Victoria Hosp. for Children, Tite-street, S.W.—Sen. Res. M.O., £200. Also Cas. O., at rate of £200.
Wimbledon Borough.—Asst. M.O.H., £600.
Windsor, King Edward VII Hosp.—Cas. O., £120.
Woolwich and District War Memorial Hosp., Shooters Hill, S.E.—Res. Surg. O., £200. Also H.P., at rate of £100.
Worcester County and City Mental Hosp., Powick.—Asst. M.O., £350.

THE LANCET 100 YEARS AGO

November 10th, 1838, p. 265.

From a leading article.

The facts communicated by our correspondent, and re-echoed in the newspapers, were briefly these:—Mr. LOCKLEY, a practitioner in Half-moon-street, London, was invited by Sir HENRY HALFORD to accompany him into the country. He was now upon the London and Birmingham Railway, on the road to Sir HENRY HALFORD's seat in Leicestershire, where several *distinguished* persons in the county had been invited to dinner. Before the train arrived at Tring, Mr. LOCKLEY fell back on his seat in an apoplexy. The President of the College of Physicians had him conveyed to the station-house, and told the persons there that the individual was highly respectable,—gave Mr. LOCKLEY's address—desired that a medical man might be sent for, and then took his seat again on the train. No medical assistance could be procured—Mr. LOCKLEY was left a prey to this dreadful disease for six hours—till, at last, a physician arrived from London. The seizure proved fatal. The physician of GEORGE IV. arrived punctually at his seat in Leicestershire—his guests were not kept a minute waiting—his cook was not disgraced—and the host did the honours of the table, to the great satisfaction of the gentry of the county; . . .

We shall not stop to inquire how this action accords with the precepts of Christianity, of which the President of the College of Physicians has said so much in his recent homilies. But we must compare it with a parallel case . . . . Now, it appears to us, that the conduct of the Samaritan presents a remarkable contrast to that of the physician, who left his friend by the wayside, at issue with apoplexy, without attempting to administer to his relief. But the Samaritan had no *distinguished* visitors in Jericho, expecting him to entertain them at dinner. No. Certainly not; *that* alters the complexion of the case.

NOTES, COMMENTS, AND ABSTRACTS

LOCALISATION IN THE CEREBRAL CORTEX

ON Thursday last Dr. E. D. Adrian, F.R.S., professor of physiology in the University of Cambridge, delivered the Ferrier lecture of the Royal Society, taking as his subject some problems of localisation in the central nervous system. By electrical stimulation of the brain, he said, David Ferrier established the main facts relating to the localisation of the motor centres in the cerebral cortex. These facts have been confirmed, on man as well as on animals, and have been of great practical as well as theoretical importance. But although they have been the basis for all attempts to analyse the cerebral organisation, they reveal mainly its receiving and executive apparatus and show little of the intervening processes. With the development of methods for recording the activity of the brain in terms of the electrical effects which it produces, the problems of cerebral localisation can be approached from another aspect. It has been found that the cerebral cortex is naturally in a state of constant activity which may take the form of a rhythmic series of potential waves—e.g., Berger's α rhythm—or of more complex and irregular oscillations. When the activity has been reduced by an anæsthetic the arrival of an afferent message has a twofold effect. It produces a direct local excitation in the region in which it arrives and a more widespread increase in the persistent activity of this and neighbouring regions. The latter result may be considered a local or regional awakening, for it resembles the generalised increase in electrical activity which occurs in the brain when a sleeper is roused. In either case, a mutual reinforcement by cortex and thalamus is an important factor in raising and maintaining the level of the "spontaneous" activity.

In certain cases electrical stimulation of the brain has the same facilitating effect as an afferent message. The spread of activity can then be followed by making simultaneous records of the potential changes at different distances from the stimulated point, and it can be shown how a number of competing wave systems can come into being.

Electrical records have not yet revealed any features peculiar to the cerebral neurones. In other parts of the nervous system there are many examples of rhythmic activity favoured by the arrival of impulses, and in the cortex, as elsewhere, there are probably all grades of spontaneity, ranging from neurone systems which cannot help discharging periodically to those which need a specific stimulus for each reaction. Thus, the activity in a given region of the cerebrum will depend on the interactions of such rhythmic and non-rhythmic systems. In normal conditions inhibition as well as facilitation will help to determine the local patterns of activity, but in records from the narcotised brain the excitatory factors are the more prominent.

A PLAN FOR A CANCER CAMPAIGN IN DENMARK

IN *Hospitalstidende* for Oct. 11th (p. 993) Dr. J. V. Andersen prefaces his plan for a cancer campaign with an account of the changes which have taken place during the past 15 years in the Danish cancer rates. In 1936 the total deaths from cancer in the country were 5612. Since 1921 the cancer mortality has risen from 13·7 to 15 per 10,000 inhabitants, and in Frederiksberg, where the average age is comparatively high, from 16·9 to 24. On the other hand, the tuberculosis mortality per 10,000 fell during the same period from 9·4 to 4·7. In other words, while there are now some fifteen deaths from cancer in Denmark every day, there are less than five from tuberculosis.

Dr. Andersen suggests that everyone between the age of forty and seventy should undergo an annual medical overhaul either by a general practitioner or by doctors working in institutions run on the lines of the existing tuberculosis dispensaries. About a million Danes belong to this age-group, and were they to be examined by the 2000 odd general practitioners, each doctor would have to examine some two persons a day throughout the year. The more popular doctors would certainly find the examinations an excessive tax on their time and would be likely to make them hasty and superficial in consequence. The second alternative would require some 200 stations, at each of which 5000 persons could be examined every year. Andersen calculates that his first alternative would cost the country 5 million kroner a year, whereas the second would entail an initial outlay of 5 million kroner and an annual expenditure of 2·6 million. He suggests that the scheme might first be worked out in a limited area containing about a tenth of the total population, though the results could hardly be judged in less than ten years. He estimates tentatively that between one and two per 1000 of the persons examined might be diagnosed early enough to permit of radical cure.

In a subsequent number of *Hospitalstidende* Andersen's plan is discussed and judged impracticable from many points of view by Dr. V. Petersen, who finds the issue clouded rather than clarified by the comparison of prophylactic examinations for cancer with periodic examinations of the teeth and the activities of tuberculosis dispensaries. He points out how seldom curable cancers are found unexpectedly in the course of routine post-mortem examinations. If such findings are few, how much fewer would they be when they depended on a clinical examination whose diagnostic efficiency would be far less. Petersen admits that symptomless cancer of the cervix or rectum can occasionally be discovered by a clinical examination, but he is convinced that the advantages accruing to Andersen's plan would be exceedingly small compared with their cost and with the panic which they might engender.

IMPERSONATIONS OF THE OPPOSITE SEX

IN the lives of women who posed as men and of men who impersonated women Mr. Thompson has chosen a subject[1] likely to attract the curious. He tells of more than twenty of these strangely inverted people—of Moll Cutpurse who learned the art of picking a pocket from a band of thieves, of the unfortunate Chevalier d'Eon, compelled by royal command to adopt woman's dress, of "Dr. James Barry," who became inspector-general of army hospitals but would never consent to learn boxing, of Mary Read, the pirate, and many others. In one sense the information he gives is almost too full; he hurries us through the incidents of these difficult careers, giving in quick succession names and dates and times and places which may be valuable to the historian but are too elaborate for the ordinary reader. He would have done better, in view of his evident sympathy with these men and women, to choose one incident in each case and to bring his insight and

[1] Mysteries of Sex. By C. J. S. Thompson. London: Hutchinson and Co. 1938. Pp. 256. 8s. 6d.

imagination to bear on its significance. For with all his well-collated facts, Mr. Thompson does not help us to get inside the skins of these people and make us feel, with them, that envy of the other sex which governed and often destroyed their lives. But it is a strange and interesting book for all that, and the portraits which illustrate it are in themselves valuable psychological material.

INFLAMMATORY PERINEAL SWELLINGS

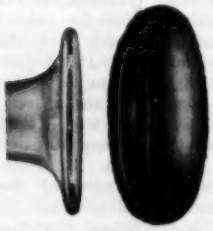
Mr. Ralph Thompson contributes to *Guy's Hospital Reports* (1938, 88, 320) a survey of inflammatory perineal swellings seen in the genito-urinary department at Guy's between 1910 and 1936. His chief conclusion is that, if a perineal swelling is secondary to a stricture, the urethra and stricture must not be touched. Should instruments be passed, or a Cock's operation performed to deal with the stricture at the same time as the inflammatory swelling is being opened, there is a grave risk of death from a descending nephritis.

The rules that he now lays down for an operation on an inflammatory perineal swelling are the following. The perineal incision must be long, and all side pockets of the abscess must be extensively opened up. When thorough hæmostasis has been secured, the wound is powdered with flowers of sulphur. Should it be necessary to deal with retention of urine, the bladder must be drained by the suprapubic route.

A RUBBER PAD FOR BREAST-PUMPS

Dr. HOWARD WILLCOX writes: A simple attachment which adds considerably to the comfort and efficiency of the existing type of breast-pump has recently come to my notice. It consists of a resilient sponge-rubber ring designed so that it can be readily sterilised and will hold firmly on to any breast-reliever.

On extensive clinical trial, both in private practice and in a maternity ward, I have invariably found a great addition to the comfort of the patient and a much more easily established suction. The value of the pad is perhaps most obvious in inflammatory conditions where the use of the standard pump is always attended by discomfort, and more often than not by considerable pain. In mastitis the irregularity of the breast renders the application of an unyielding substance painful and often inefficient. This difficulty is easily overcome when the pad is in situ, and a recovery of the condition is accelerated by the removal of external irritation and excess pressure.



The bruising frequently accompanying the use of a breast-pump in normal cases—i.e., where exhaustion of the breast is necessary because of poor nipples or a premature child—is never seen when the pad is used. Incidentally, in hospitals, where breakages are common, it has been found that since the introduction of these pads the number of damaged breast-pumps has been materially reduced because of the protection afforded to the glass end.

The pad is made by Messrs. J. G. Franklin and Sons, Ltd., London, and is called the "Simplic" breast-reliever pad.

HEMINEPHRECTOMY IN DISEASE OF THE DOUBLE KIDNEY

THE advent of pyelography has led to the discovery of cases of double kidney that previously would have passed unnoticed. In consequence, the operation of heminephrectomy, which previously was a surgical curiosity, has now become comparatively common. Edwin Beer and W. H. Mencher publish an article on the subject in the October number of the *Annals of Surgery* (p. 705) based on records of 14 cases of heminephrectomy in their practice. The commonest indication is hydro- or pyo-nephrectomy of half of the kidney. Malignant disease is an absolute contra-indication, and, since in tuberculosis the parenchyma of the second half of the kidney is commonly involved, tuberculosis is generally a relative contra-indication. It is obvious also that nothing is gained by an attempt to save a portion of the kidney if its function is poor, if there is a single blood-supply to both poles, or if the technical difficulties are very great. The most important point in the operative technique is a good exposure that will allow of a dissection of the two ureters, and an accurate study of the renal blood-supply. After removal of the diseased portion of the kidney, hæmostasis is obtained by the insertion of mattress sutures that are prevented from cutting into the kidney by placing under them fragments of fat, muscle, or fascia.

Appointments

ANDERSON, B. W., M.D. St. And., D.P.H., Medical Officer of Health for East Fife.

ASHER, CECILE, M.D. Lond., M.R.C.P., D.C.H., Hon. Assistant Visiting Physician to the Duchess of York Hospital for Babies, Manchester.

BROWN, G. G., L.R.C.P.E., Deputy Medical Superintendent at the Cefn Coed Hospital, Swansea.

CHIGNELL, RICHARD, L.R.C.P., Resident Aural Registrar at the Hospital for Sick Children, Great Ormond-street.

GAULD, W. R., M.B. Aberd., Medical Registrar at the Aberdeen Royal Infirmary.

GILBERT, BARTON, M.D. Lond., F.R.C.S., M.C.O.G., Second Gynæcologist to the Metropolitan Hospital, London.

JOHNSTONE, J. S., M.B. Aberd., Assistant Medical Officer at the County Mental Hospital, Whittingham, near Preston.

*LAWRENCE, R. F., M.B. Leeds, Assistant to the Obstetrical Officer, Grade II, Withington Hospital, Manchester.

LEE, MAURICE, M.B. Durh., F.R.C.S., Assistant Surgical Officer at the Willesden General Hospital.

SELLORS, T. HOLMES, D.M., M.Ch. Oxon., F.R.C.S., Visiting Thoracic Surgeon to the Osler Pavilion of the Radcliffe Infirmary.

Ministry of Health.—The following have been appointed medical officers:—

BRUNYATE, W. D. T., D.M. Oxon., D.P.H.;
GODBER, G. E., B.M. Oxon., M.R.C.P., D.P.H.;
KELLY, G. C., M.D. Aberd., D.P.H.;
KENNEDY, W. P., Ph.D. Edin., L.R.C.P.E., F.R.S.E.;
NORMAN, L. G., M.D. Lond., M.R.C.P.; and
WINTELER, J. C., M.D. Lond., M.R.C.P.

* Subject to confirmation.

Births, Marriages, and Deaths

BIRTHS

ELWELL.—On Nov. 5th, the wife of Dr. Graham Elwell, of Mirfield, Yorkshire—a son.

TREVELYAN JONES.—On Nov. 5th, the wife of Dr. R. Trevelyan Jones, of Wolverhampton—a daughter.

LANKESTER.—On Oct. 27th, at Hurst Green, Oxted, the wife of Dr. John Lankester—a son.

PERKINS.—On Nov. 5th, at Epsom, the wife of Dr. Christopher Perkins—a son.

SPENCER.—On Nov. 1st, at Shrewsbury, the wife of Dr. John G. Churchill Spencer—a daughter.

STEWART SANDEMAN.—On Nov. 3rd, the wife of Dr. Stewart Sandeman, of Durness, Sutherland—a son.

WYNNE THOMAS.—On Nov. 1st, at Woolhampton, Berks, the wife of Dr. G. Wynne Thomas—a daughter.

MARRIAGES

FITCH—MOTT.—On Nov. 1st, at Liverpool, Arthur A. Fitch, M.R.C.S., to Joan Mott.

DEATHS

HAWKESWORTH.—On Oct. 31st, at Lyndhurst, Thomas Ayscough Hawkesworth, M.B. Lond., M.R.C.S., formerly of Watlington.

HICKMAN.—On Nov. 6th, at Newbury, Richard Hickman, J.P., M.R.C.S., in his 91st year.

IRWIN.—On Nov. 7th, at Bideford, Devon, Major-General Sir J. Murray Irwin, K.C.M.G., M.D. Dubl., in his 81st year.

SLOWAN.—On Nov. 6th, at Falmouth, William John More Slowan, O.B.E., M.D. Glasg.

THURNELL.—On Nov. 1st, Herbert Leslie Thurnell, M.A. Camb., M.D. Dubl., of Gravesend, aged 74 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.